

**WEST BANK/GAZA**

**RAFAH ENTERPRISE PARK  
FEASIBILITY STUDY**

**VOLUME I  
MAIN REPORT (FINAL REVISED)**

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for the

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and the

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by

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**NOTE TO FEBRUARY 2001 EDITION OF THE RAFAH ENTERPRISE CENTER FEASIBILITY STUDY**

This study was substantially completed before September 2000. Since that time there has been a dramatic deterioration in the security situation in Gaza and the West Bank, resulting in frequent border closures and civil disturbances.

The assumptions on which this feasibility assessment were based can no longer be taken to be valid. This applies particularly in the benchmarking, market assessment and demand projection sections, and may apply to the assumptions related to the cost of provision of infrastructure, and any other cross boundary linkages – economic, commercial or physical.

The Implementation Plan Section is also clearly no longer valid.

Before acting on any of the recommendation contained in this report, **it is strongly advised** that these sections be revisited once conditions on the ground allow.

The Services Group, Inc.

February 2001

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## Executive Summary

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### 1. Introduction

This feasibility study is being carried out by The Services Group (TSG) for the Palestinian Industrial Estates and Free Zones Authority (PIEFZA) under the United States Agency for International Development (USAID)-funded SITE Project. The study assesses the technical, financial, and economic feasibility of establishing the Rafah Enterprise Park (REP), a technology-focused industrial estate to be located in the Gaza Strip.

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### 2. Project Structure

The REP is intended as a project that complements the existing Gaza Industrial Estate (GIE) by focusing on attracting investment in technology-intensive industries by offering attractive facilities and services, and complementing them with enterprise development/incubation activities and technology education and training. This approach is aimed at diversifying the economy of the Gaza Strip; decentralizing economic development beyond the GIE, and establishing regional linkages to complementary projects being planned in Israel and Egypt.

The project will maximize private sector participation by relying on an operator/developer to implement the REP. The main physical components of the REP will include:

- An Industrial Park (IP) that offers investors a mix of serviced industrial plots and pre-built Standard Factory Buildings (SFBs).
- An incubator-style Enterprise Development Center (EDC) that offers small and start-up enterprises shared facilities and business support services.
- Land allocated for a proposed Technical College, which may be introduced by a private investment group.
- Linkages to “Sister Facilities” being proposed by both Israel and Egypt. In terms of planning, it is assumed that the Israeli facility will be constructed first.

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### 3. Competitive Benchmarking

In order to understand the REP's comparative advantages and disadvantages as an investment location, relevant factor costs and other site attributes were benchmarked against those of competing locations, including Matam Technology Park in Israel; Port Said Free Zone, Egypt; Al-Hassan Industrial Estate, Jordan; Jebel Ali Free Zone, Dubai; and Aegean Free Zone, Turkey. Based on this comparison, several REP attributes emerge as particularly attractive for potential investors:

- **The REP is an attractive platform for exporters to North American, European and regional markets.** The REP benefits from trade agreements that provide WBG-based producers with preferential access to North American, European, and regional markets.
- **The REP offers a growing pool of skilled and productive workers at competitive labor rates.** REP can offer investors a growing pool of skilled workers who have direct experience in a more advanced industrial economy (*i.e.* Israel) across a wide spectrum of industry sectors. While wage rates are higher in Gaza for lower-skilled labor categories, *vis-à-vis* competing locations such as Egypt and Jordan, Gaza is more cost-competitive in higher skill categories.
- **The REP will have access to world-class transportation infrastructure.** The REP, given its proximity to Israel, has access to high-quality transportation (including Ashdod seaport and Ben Gurion airport). In addition, while it is unlikely that the Gaza Port will be completed within the next two to three years, it is likely that the Gaza International Airport will enhance the REP's access to external markets.
- **The REP will provide fully serviced industrial space in a secure environment.** Gaza industry has been constrained over the years by the lack of serviced industrial facilities with inadequate utilities infrastructure. The provision of such infrastructure in the REP will resolve one of the most pressing issues that have served to constrain the development of local industries. In addition, the REP's location along the Green Line with Israel will provide Israeli investors with a more secure,

closure-proof investment environment, the absence of which has deterred Israeli investment into Gaza in the past.

Table 1 provides a summary, factor-by-factor, of the REP's competitive position, relative to the selected comparator locations in the Middle East region.

**Table 1: REP Competitive Benchmarking Summary**

<b>Competitive Factors</b>		
▪ Availability of <b>high-skilled, productive workforce</b> – more productive than Egypt, Jordan, Turkey and Dubai	▪ <b>Airport Infrastructure and Facilities (Ben Gurion and GIA)</b> – high quality comparable with others in region	▪ <b>Preferential market access</b> to U.S., Europe and region, though access shared by others as well
▪ <b>High-skilled labor costs</b> – competitive with others in region	▪ <b>Seaport Infrastructure and Facilities (Ashdod)</b> – high quality comparable with others in region	▪ <b>Power Infrastructure (Israeli grid)</b> – high quality comparable with others in region
▪ <b>Sea Transport Costs</b> among lowest in region		
<b>Moderately Competitive Factors</b>		
▪ <b>Telecommunications Infrastructure</b> on par with Egypt and Jordan, though not competitive with Israel	▪ <b>Investment Incentives</b> – on par with most other locations in the region, though not competitive with Jebel Ali and Aegean free zones	
<b>Uncompetitive Factors</b>		
▪ <b>Lower-skilled labor costs</b> – though lower than Israel and Turkey, significantly higher than Egypt and Jordan	▪ <b>Water Infrastructure</b> – water shortages shared by Israel and Jordan	▪ <b>Political Risk</b> – higher perceived risk than others in region due to uncertain political status
▪ <b>Cost of Electricity</b> higher than other locations	▪ <b>Cost of Water</b> higher than all other locations, except Jordan	▪ <b>Import/Export Procedures</b> – longer delays than others in region
▪ <b>Cost of Air Transport</b> higher than Jordan, Egypt and Dubai	▪ <b>Cost of Advanced Telecommunications</b> higher than others for advanced services	▪ <b>Cost of Land and Building</b> higher than Israel, Jordan, Egypt and Turkey

#### 4. Demand Assessment

In order to develop an REP “product” that can take advantage of the site’s competitive attributes, it is important to design a package of services and facilities that is responsive to demand by investors.

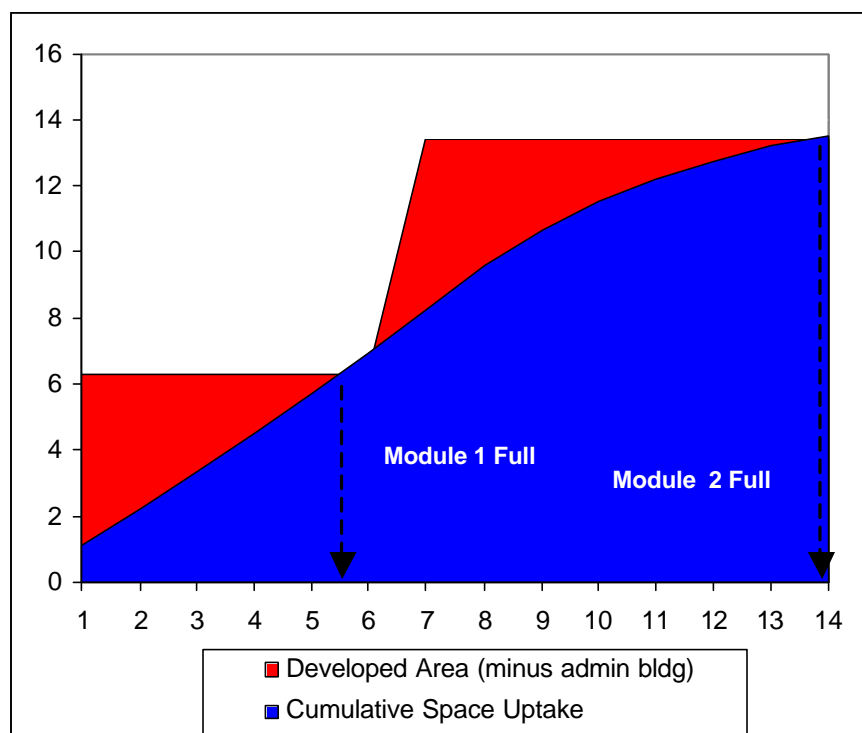
**Table 2: Summary of Target Industries and Sources of Investment**

Industry	Niche Activities	Primary Sources	Secondary Sources
Food Processing	<ul style="list-style-type: none"> <li>Processing of local &amp; Israeli produce and dairy products for Israeli (and local) consumption</li> <li>Processing of local agriculture for export to regional and world markets</li> </ul>	Israel	Gaza & Diaspora
Electronics & Electrical Appliances	Consumer electronics and white goods: <ul style="list-style-type: none"> <li>“Offshore” production from Israel</li> <li>Regional “point-of-sale” operations</li> </ul>	Israel-based including MNCs	Diaspora & Gaza
Textiles	<ul style="list-style-type: none"> <li>Textiles (woven and knitted fabrics) for local and Israeli apparel sectors</li> </ul>	Israel	Gaza & Diaspora
Apparel	<ul style="list-style-type: none"> <li>High value-added apparel for export to U.S. and EU</li> </ul>	Israel	Gaza & Diaspora
Rubber & Plastics	Lower value products, including: <ul style="list-style-type: none"> <li>spare automotive and machinery parts,</li> <li>household goods,</li> <li>packaging materials, and</li> <li>building and construction materials.</li> </ul>	Israel	Gaza & Diaspora
Paper Packaging	<ul style="list-style-type: none"> <li>Paper packaging materials including paperboard boxes</li> </ul>	Israel	Gaza & Diaspora
Furniture	<ul style="list-style-type: none"> <li>Office furniture (metal, plastic, and wood)</li> </ul>	Israel	Gaza
Logistics & Warehousing	<ul style="list-style-type: none"> <li>Outbound logistics for finished products for export from REP-based enterprises</li> <li>Warehousing and distribution for inbound consumer and other goods for local market</li> </ul>	Gaza	Israel & Diaspora
Other Potential Sectors	<ul style="list-style-type: none"> <li>Paper packaging</li> <li>Toys and Games</li> <li>Footwear and other leather goods</li> </ul>	Israel, Gaza	

In order to model the impact of investor demand on the physical and financial configuration of the REP, the feasibility study looks at the demand scenarios for the two main components of the REP product: the Enterprise Development Center and the Industrial Park. These demand scenarios are based on TSG market research for the REP, including approximately 200 interviews with potential investors in key markets. Market research identified target industry sectors and the most promising sources of investment in those sectors, based on the REP's key location attributes and industry trends that would favor the REP as an investment location. Table 2 provides an overview of the target industries and markets for the REP.

Following the identification of the above target sectors and sources of investment, industry surveys were carried out with approximately 200 potential investors in Gaza, Israel (including Israel-based multinationals), Egypt, and the Palestinian Diaspora.

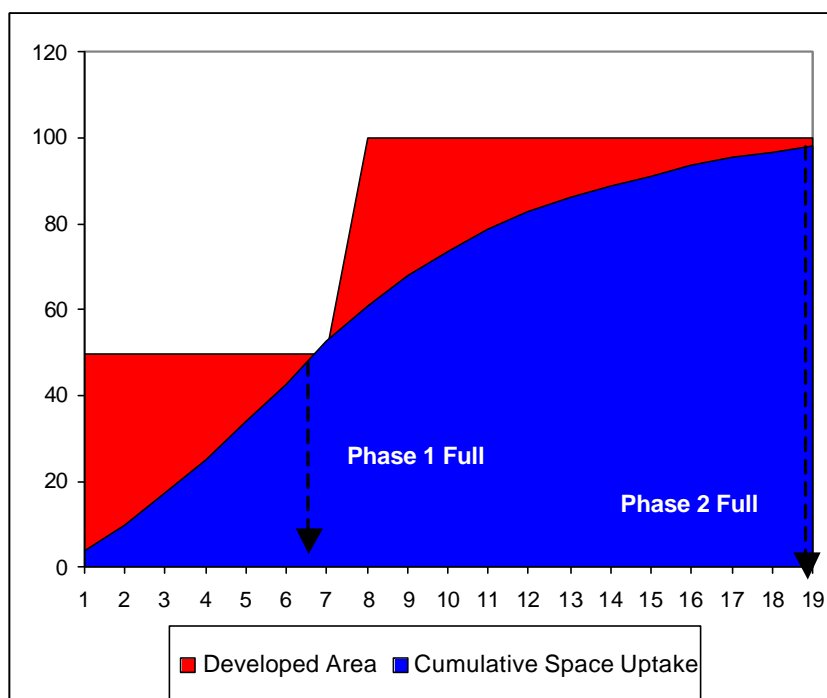
**Figure 1: EDC Space Uptake**



The results of the surveys were used to verify the results of the market research and to provide a basis for extrapolating demand for space in the REP. Figures 1 and 2 demonstrate the development scenarios for the EDC and Industrial Park components of the REP, respectively.

As seen from Figure 1, based on the survey results, the first module of the EDC is expected to fill up by the middle of the sixth year of development. The second module is expected to fill up by the end of year 14. As illustrated by Figure 2, based on the survey results, the first 50-hectare phase of Industrial Park development is expected to fill up by the middle of the seventh year of development. The second 50-hectare phase is expected to fill up by the end of year 19.

**Figure 2: Industrial Park Space Uptake**



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**5. Site Conditions and Existing Infrastructure**

The proposed site for the Rafah Enterprise Park (REP) is located at the southeastern end of the Gaza Strip, to the east of Rafah city, at the eastern borders with Israel. The site's most important attributes for planning purposes include:

- Close proximity to the Egyptian border (5km), Gaza International Airport (1.5km), and Khan Younis (8.5km)
- Limited saturated zone thickness of the aquifer underlying the REP means that on-site well drilling is not a viable option.
- Surface water drainage is facilitated by the site's gentle slope towards the east.
- The site has good access to the Gaza Strip's main Road #4 via the airport access road.
- The area in which the site is located does not have a municipal water supply – instead, water is provided by an Israeli water utility. The airport does pump some ground water from a well at the western end of Rafah City.
- The Tel Sultan wastewater treatment plant that serves the Rafah area is currently overloaded.
- The existing Israeli high voltage line serving the Rafah area is overloaded, and cannot meet the REP's energy requirements.
- The main fiber optic telecommunications link connecting Israel and the Gaza Strip passes through the REP site.
- The few existing structures on the REP site that require relocation include a small chicken farm, two green houses, two military watchtowers, a small cemetery, and a telephone manhole.

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**6. Master Plan and Physical Facilities**

The REP's master plan was designed to accommodate the industry demand described above. The guiding principles adopted in developing the master plan included:

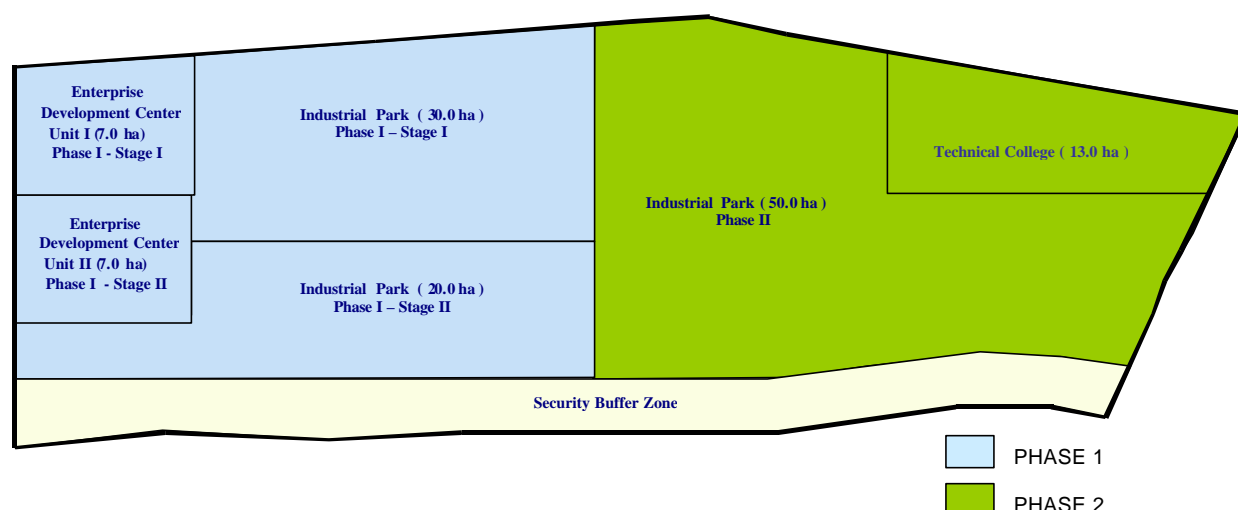


- **Maximization of Land Use.** It is very important to provide a logical framework for the zoning of the industrial activities and to maximize the efficiency of land use and infrastructure provision within the REP. It is also important to provide flexible site layouts, which minimizes conflicts between different industrial activities and can accommodate changing industrial requirements.
- **Minimization of Total Cost.** The site was planned on the basis of a grid system in order to minimize the cost of onsite infrastructure. The sizes of plots are defined based on the industry demand.
- **Minimization of Environmental Impacts.** Environmental impacts are minimized by providing good quality landscaping and structural planning. This will also be achieved by incorporating green areas and extensive tree planting along the boundaries of the site.

The site was also planned taking into account the possible future expansion of the REP. Access to Rafah, the Gaza International Airport, proposed Israeli industrial area and a possible connection of with an industrial area in Egypt were considered.

The master plan represents a flexible plan than can be gradually implemented. REP implementation is planned in two development phases:

- The first phase includes the development of 14 ha for the Enterprise Development Center (7 hectares each unit), as well as 50 ha for the industrial park.
- An area of 50 ha for possible future expansion of the Industrial Park and 13 hectares for the Technical College comprise the second development phase.

**Figure 3: Master Plan Components and Phasing**

The main components of the Master Plan are thus:

- Industrial Park (IP)
- Enterprise Development Center (EDC)
- Area for Future Expansion of the Industrial Park, and
- Technical College campus

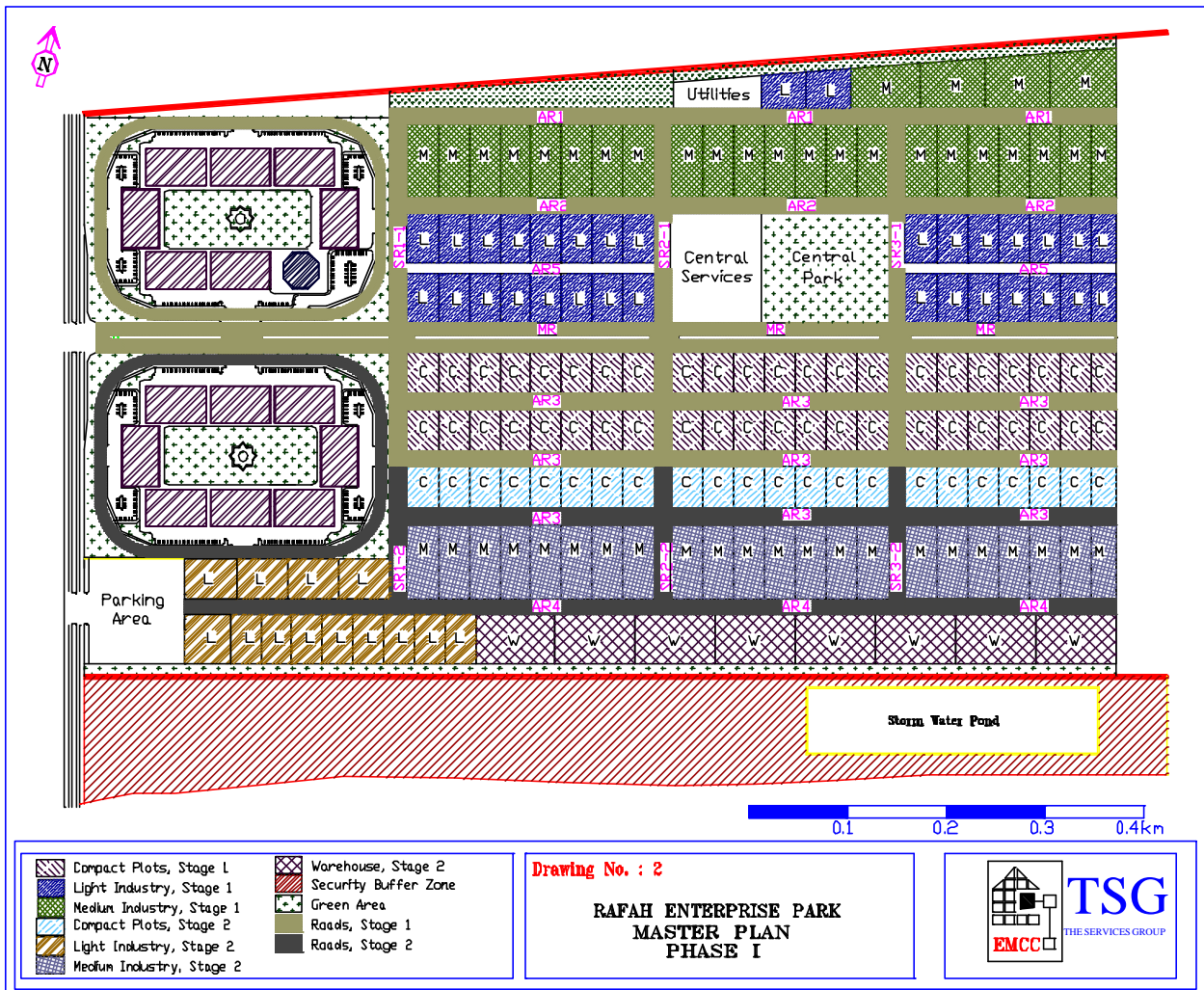
The 50 ha Industrial Park site is planned to accommodate four basic categories of plots. There are 66 Compact plots mainly for Local Businesses, 45 plots mainly for Light Industries, 48 plots mainly for Medium Industries, and 8 plots for Logistics/Warehousing (see Figure 4).

The Industrial Park plan also includes an area for central services buildings and a park. A total area of 10,000m<sup>2</sup> is allocated for public facilities, including a clinic, police station, fire station, and a mosque. This facility also includes an administration center and banking and other commercial activities to serve the investors and workers in the Rafah Enterprise Park.

The EDC is planned for a total area of about 14 hectares (140 dunums). It will be constructed in two stages, starting with the western unit which will host an administration and services center in addition to 7 production buildings. The eastern unit is planned to contain 8 production buildings.

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Figure 4: Rafah Enterprise Park Master Plan



The main infrastructure requirements associated with this master plan include:

- Construction or upgrading of six access roads to connect the REP to the existing transportation network and the Sufa border crossing. In addition, the REP will require 7km of on-site road network.
- Access to adequate water supply from the existing airport well via a connection the existing 200mm trunk line. This connection will consist of a 1,400m long 200mm UPVC pipe, as well as a submersible standby pump.
- An on-site wastewater treatment plant. However, if the new Rafah/Khan Younis treatment plant is implemented in time, the REP could discharge wastewater to this facility instead.
- A new 11 MW connection to the Israeli electricity grid, supplemented by on-site standby diesel generators.
- Central REP services and EDC/IP buildings.
- On-site service distribution, storm water drainage, and landscaping.

## 7. Capital Investment Requirements

In order to implement Phase 1 of the master plan described above, the following capital and recurrent budgets must be funded through a combination of public and private investment:

**Table 3: Summary of Capital Costs**

Cost Component	Phase 1 Cost (US\$)
Offsite Infrastructure	7,497,750
Onsite Infrastructure	10,847,136
Industrial Park (IP) Buildings	616,000
Central Commercial Services	1,404,024
Enterprise Development Center (EDC)	11,603,303
<b>Total</b>	<b>31,968,213</b>

Table 4: Summary of Recurrent Costs (US\$)

Cost Component		Annual Cost (US\$)
<b>Operation and Maintenance Costs</b>		
	Offsite Infrastructure	146,543
	Onsite Infrastructure	89,548
	IP Buildings and Central Services	83,606
	Enterprise Development Center	116,538
	<b>Subtotal</b>	<b>436,205</b>
<b>Environmental Monitoring</b>		<b>40,000</b>
<b>GRAND TOTAL</b>		<b>476,205</b>

## 8. Financial Analysis

The financial model tests the conditions under which these costs can be allocated between the public and private sector in order to structure a development approach that makes the REP attractive to the private sector while conserving public funds. The main output of the model is the Internal Rate of Return (IRR) of the project cash flow for the developer and for PIEFZA, under a range of conditions. There are two separate but related elements to the REP, - the Industrial Park (IP), and the Enterprise Development Center (EDC). These two elements were modeled separately because they display different characteristics in terms of costs, land use, and scale of demand. The income and investment streams for the two elements were then combined, giving an overall return for the project.

In the physical planning of the REP, it was decided to plan the development in two Phases – Phase I and Phase II. This analysis is only concerned with Phase I because this phase represents over 60ha of development, more than enough to determine the feasibility of the project.

The model's base case assumes that:

- Donors/PIEFZA fund off-site infrastructure costs, 4,800m<sup>2</sup> of IP “starter buildings”, and 2,250m<sup>2</sup> of EDC “starter buildings.”
- Onsite infrastructure and buildings are provided by the private developer.
- The REP is let under a 20-30 year concession agreement, under which the developer leases land at US\$2,000/ha/year

for the IP and \$5,000/ha/yr for the EDC, and remits 5 percent of profits to PIEFZA once his return on investment reaches 15 percent. In addition, PIEFZA receives an up-front payment of US\$500,000 for the concession to develop the IP portion of the REP (the EDC concession requires no up-front payment).

Under these assumptions, the **Rafah IP** base case IRR for a private developer is 14.97%, a level sufficient to attract a private developer. The IRR for the public sector (PIEFZA) is –5%, largely because PIEFZA bears the cost of the initial REP land purchase. However, because PIEFZA passes the land on through a concession rather than an outright sale to the investor, this IRR is acceptable on the basis that the underlying asset remains with PIEFZA and economic rate of return is positive (see Ch 9).

Returns for the **Rafah EDC** are less favorable, with a private developer IRR of 11.24% - which is probably not sufficient to attract a private developer. The IRR is constrained by rent levels (particularly because the Israeli “sister facility” will probably offer much lower, subsidized rents).

The two elements combined offer a reasonable return, as indicated in Table 5 below, where Scenario 1 represents publicly provided startup buildings distributed more or less equally between the IP and the EDC, and Scenario 2 represents publicly provided startup buildings (4,000m<sup>2</sup>) located only at the EDC.

**Table 5 – REP Returns and Investment for the Combined Approach**

Scenario	Dev. IRR %	Dev. Inv \$m	Pub. Inv \$m	Total Inv \$m	Private %
1	14.40%	58.0	14.0	72.0	81%
2	14.09%	58.2	12.4	70.6	82%

It is thus clear that a traditional industrial park at Rafah, with the initial donor/PIEFZA support assumed in the base case analysis, is feasible and will offer a developer returns of about 15%. Given the clear commitment that has already been demonstrated by the PA to the project through its land acquisition actions, and the existence of the Rafah Airport, a developer should find this opportunity of interest. On this basis alone, it is possible to make

a decision to proceed with the provision of the off-site infrastructure and starter buildings to the Rafah site.

It is, however, unclear how the Rafah EDC can attain feasibility without charging much higher rents than currently charged at equivalent facilities in Israel, and without significant public startup support - to the extent of PIEFZA/donors providing 5,000m<sup>2</sup> of EDC type building at startup. However, from a practical perspective, these seemingly contradictory positions can be reconciled. The initial planning for the Rafah Enterprise Park (the collective term for the two elements – Rafah IP and Rafah EDC) can be made flexible enough to allow the elements to develop at their own pace. There are no substantive differences in the infrastructure requirements of the two elements, so it is possible to proceed with the provision of infrastructure on the basis of using it for an Industrial Park, while leaving the option open for the development of the EDC when conditions allow.

The combined elements (IP and EDC) provide a reasonable return at around 14%, and so both elements should be concessioned as one entity. Configuration of the site between the IP and EDC activities can be negotiated as part of the concessioning process. In this case the recommendation is to start with public support for 4000 m<sup>2</sup> of EDC starter building, which can also initially serve as support buildings for the IP.

## Rafah Enterprise Park Feasibility Study

## 10. Implementation Plan

Task	Responsible	Duration	2000		2001				2002			
			Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Site assembly	PIEFZA	2 months	■	■								
Demolition/relocation of structures	PIEFZA	4 months	■	■	■	■						
Permitting and licensing	PIEFZA	5 months	■	■	■	■	■					
Negotiations with Israeli side	PIEFZA	Ongoing	■	■	■	■	■	■				
Finalize off-site design options	PIEFZA	3 months	■	■	■							
Detailed off-site design	Contractor	6 months	■	■	■	■	■					
Award off-site contract(s)	PIEFZA	1 month	■			■						
Off-site Construction (Phase 1)	Contractor	6 months		■	■	■	■	■				
Submit detailed on-site proposal(s)	Developer(s)	5 months		■	■	■	■	■				
Select private developer	PIEFZA	1 month		■		■						
Finalize concession agreement	PIEFZA	2 months		■		■						
Construct on-site services (Stage 1)	Developer	8 months		■	■	■	■	■	■	■		
Construct industrial park (Stage 1)	Developer	12 months		■	■	■	■	■	■	■	■	
Construct EDC (Stage 1)	Developer	10 months		■	■	■	■	■	■	■	■	
Market REP - General	PIEFZA	Ongoing	■	■	■	■	■	■				
Market REP to investors/tenants	Developer	Ongoing	■	■	■	■	■	■	■	■	■	■



# 1. Introduction

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## 1.1 Project Background

This feasibility study is part of the Palestinian effort to foster economic growth and diversification in the Gaza Strip and West Bank through the development of industrial estates. The existing Gaza Industrial Estate and the proposed industrial estate projects in Nablus, Jenin, Tulkarem, and Tarqumiya aim to accomplish this goal by offering investors a range of investment locations from which investors can access modern infrastructure, low-cost labor pools, and regional and international end user markets. This Palestinian industrial estate portfolio is diverse enough to allow individual estates to specialize, be it in terms of factor costs; local labor supply; location near transport nodes; or proximity to neighboring industry clusters.

In the Gaza Strip, the existing Gaza Industrial Estate (GIE) at Karni has been able to attract over 25 companies and create 1,500 jobs, primarily by offering an investment platform that allows manufacturers to take advantage of the Gaza Strip's low labor costs to produce goods for the Israeli and export markets. However, the GIE's continuing success in attracting relatively low-skill, labor-intensive investment does not mean that other kinds of investment cannot benefit from an investment location in the Gaza Strip.

Already, investor inquiries in more technology-intensive industries are beginning to complement the existing investment inflows in apparel and basic assembly. In addition, it has been suggested that a second industrial estate at Rafah in the Gaza Strip may be warranted to provide access to unemployed labor in the western part of the Gaza Strip, and to take advantage of potential strategic linkages between the Gaza Strip, the Israeli and Egyptian borders, and the proximity to the Gaza International Airport.

In order to investigate the feasibility of such an industrial estate, the United States Agency for International Development (USAID) has funded this study under the SITE Project, which is being implemented by The Services Group (TSG). The SITE Project provides technical assistance to the Palestinian Industrial Estates and Free Zones Authority (PIEFZA), the regulatory body that

oversees and promotes the Palestinian Authority's industrial estates initiative.

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## 1.2 Analytical Approach

This feasibility study first defines an appropriate project structure, and then tests its financial and economic feasibility under a variety of scenarios. The project structure takes into account a variety of components, including off-site infrastructure provision; on-site industrial estate development; and both publicly and privately financed enterprise and workforce development initiatives.

The financial and economic analyses then test the feasibility of the industrial estate from the perspective of the private developer and the Palestinian economy as a whole. The robustness of both financial and economic returns is then examined through a series of sensitivity analyses. These analyses are iterative in nature, and serve not only to measure the outcome of a pre-defined private investment project, but also to define the transactions between the private developer, PIEFZA, tenants, and USAID that are required to implement the project.

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## 1.3 Report Organization

The feasibility study is divided into the following chapters:

Chapter 2: Project Structure defines the composition of the project concept that is being tested in this feasibility study.

Chapter 3: Competitive Benchmarking compares the project against competing investment locations in the Middle East in terms of factor costs and attributes.

Chapter 4: Demand Assessment combines the benchmarking research with industry surveys to develop likely investment scenarios for the project.

Chapter 5: Existing Physical Conditions describes the proposed Rafah site according to its physical attributes and access to existing utility connections and infrastructure.

Chapter 6: Master Plan and Physical Facilities develops a proposed master plan for off-site and on-site infrastructure, based on the demand assessment developed in chapter 4.

Chapter 7: Capital Investment Requirements develops phased schedules of infrastructure investments required to implement the master plan.

Chapter 8: Financial Analysis calculates financial returns of the project accruing to the private developer under a variety of assumptions and scenarios.

Chapter 9: Economic Analysis calculates economic costs and benefits accruing to workers, investors, and the Palestinian Authority under a variety of assumptions and scenarios.

Chapter 10: Implementation Plan sets out a schedule of implementation steps required to turn the proposed industrial estate into reality.

## 2. Project Structure

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### 2.1 Project Rationale

The rationale for establishing a new industrial estate at Rafah is based on three economic development goals:

Diversification. There is a desire to diversify the Gaza Strip economy by moving from labor-intensive, low-skill production to more skill- and technology-intensive activities. Because the local skills and technology base is currently relatively low, such diversification requires a long-term strategy that integrates industrial estate development with enterprise and human resource development components.

Decentralization. Investment in the Gaza Strip is currently concentrated at the GIE, drawing on Gaza City and surrounding labor pools. An additional industrial estate in the western part of the Gaza strip can provide better access to existing labor pools in Khan Younis and surrounding areas.

Regional Linkages. The Rafah area is located both on the border with Israel and in close proximity to the Gaza International Airport and the land border crossing in to Egypt. Access to these regional transportation linkages could help to position the industrial estate as a regional manufacturing and distribution center in the long term.

Implement a project that can help to achieve these goals over time will require a project that involves a larger number of stakeholders and offer a more diverse range of services than a traditional industrial estate such as the GIE. The project evaluated in this study, hereafter referred to as the “Rafah Enterprise Park,” is an integrated, multi-use development that combines elements that include:

- Serviced industrial land
- Pre-built standard factory buildings (SFBs)
- Enterprise development/incubation
- Technical education and training

The Rafah Enterprise Park (REP) approaches this challenge through a sequenced develop strategy, by first developing

traditional industrial estate “products,” enhancing them with business development and incubation functions, and building a critical mass of industry and potential entrepreneurship that can then attract and benefit from technical education and training facilities. This sequenced approach allows for flexible implementation of the REP by balancing achievable near-term project development objectives with long-term economic development goals. The physical components of the REP will be located on a pre-identified 145-hectare border site at Rafah and include:

Industrial Estate: A traditional industrial estate component that offers both serviced industrial land and SFBs to investors who are looking for an available investment location and are interested in taking advantage of industrial estate-specific incentives.

Enterprise Development Center (EDC): A smaller, incubator-type shared industrial facility that offers smaller office/production facilities and shared business support services to small and start-up enterprises. The EDC will help to build new businesses that can eventually graduate from the EDC to become regular industrial estate tenants.

Technical College: REP project planning includes setting aside a designated area for the eventual introduction of a technical college to train workers, support business development, and increase the skills and technology base of the local economy.

Sister Facilities: Initial discussions with Israeli parties indicate that a “sister estate” will be developed on the Israeli side of the border. This estate could include both industrial estate and EDC-type components. It is hoped that the Israeli and Palestinian projects can be linked through streamlined border crossing procedures for goods, workers, and managers. In addition, preliminary plans are being formulated by the Egyptian government for the development of a new industrial city on the Egyptian border. While this project is less well-developed and would not immediately border the REP, its proximity to the Palestinian and Israeli projects would create new opportunities for cross-border production sharing and other potential synergies.

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## **2.2 Institutional Relationships**

The REP is to be implemented under the Palestinian industrial estates program, under PIEFZA's regulatory framework. PIEFZA will issue and approve licenses, help to promote the estate, and ensure that developers and tenants comply with applicable laws and regulations. At the same time, PIEFZA is the main coordination focus for cross-cutting activities (such as the EDC and technical college) that can benefit from cooperation with other PA agencies (such as the education ministries and the ministries of industry and planning).

A private developer or developers will invest in providing the basic industrial estate, EDC facilities, and ancillary services, and operating them on a for-profit basis. The developer(s) will operate under the industrial estate regime administered by PIEFZA, but have independent responsibility for marketing and managing the industrial estate. The EDC may be operated in conjunction with public agencies, as agreed to by the developer(s).

The Israeli "sister estate" will exist outside the PIEFZA umbrella, under Israeli law and incentive schemes. Joint security arrangements, planning, and infrastructure provision will be negotiated between the PA and the Israeli government. Israeli and international investors will be free to participate in the REP as tenants or development partners.

The technical college will fall within the land use/zoning plan of the REP, but its technical accreditation and standard setting will be subject to the Palestinian educational system.

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## **2.3 Relationship with Other Industrial Estates**

The REP described here will offer unique enterprise and human resource development opportunities in the context of an industrial estate. As such, the REP's structure and mission differs from other industrial estate projects being planned and implemented in the West Bank and Gaza Strip. This degree of specialization – focus on technology and skills development, and cross-border integration – is aimed at expanding the development opportunities available to the industrial estates program rather than competing directly with other industrial estates projects. These potential synergies are especially strong in the case of two projects, the

GIE and the Khadoury Information Technology Estate (KITE) at Tulkarem.

The GIE has successfully established the Gaza Strip as a Palestinian investment location, and already hosts 25 tenants (another 20 have submitted applications), mainly in low-skill, labor-intensive activities. While the GIE is already absorbing some technology-focused investments that cannot wait for the establishment of the REP, the GIE lacks the long-term technology and skills development vision that is driving the REP. Together, the GIE and the REP will be able to offer potential investors in the Gaza Strip a wider variety of investment locations and services, cross-border trade modalities, and access to virtually the entire Gaza Strip labor market.

The only other industrial estate project with a skills and technology development focus is the KITE. The KITE's focus on software and IT services (based on its proximity to Israel's high-technology corridor) means that investors are unlikely to choose between Tulkarem and Rafah. Instead, technology-based manufacturers will be drawn to Rafah or other Palestinian industrial estates, thus conserving the KITE's small, urban site, which is not suitable for extensive manufacturing activities. Instead of competing, the REP and the KITE will complement each other by focusing on specific market niches in which the skills and technology intensity of the Palestinian economy can be improved.

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## **2.4 Private Sector Participation**

The REP is designed as a private-sector development that is supported by specific public sector assets in developing the skills and technology intensity of the local economy. The project is unique in that candidates for many of the private development and investment roles have already expressed an interest in the REP.

A private Palestinian development consortium has expressed an interest in implementing the REP's Industrial Park and EDC components. This consortium is also linked to an Israeli property development group that has made a concrete proposal for developing the Israeli "sister estate" counterpart of the EDC. Between the Palestinian consortium and its Israeli partner, the capital and skills required to implement the REP could be accessed quickly.

In terms of developing a technical college on the REP site, a private group has already expressed an interest in taking on this traditionally public-sector role. The Palestinian Technology and Education Complex (PTEC) group is planning to develop a privately financed technical college in the Gaza Strip, in cooperation with a Canadian polytechnic. PTEC has expressed an interest in locating its project on the REP if land can be made available.

Regardless of whether any of these groups are selected to implement the REP, or whether the project will be awarded on a tender basis, the existing level of interest by private investors in developing the REP indicates the project's fundamental conceptual appeal. The remainder of this study evaluates how the REP can be structured to make it attractive at the financial and economic as well as at the conceptual level.



## 3. Location Audit/Competitive Benchmarking

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### 3.1 Overview and Methodology

This chapter examines, from a site-seeker's perspective, the competitiveness of the proposed Rafah Enterprise Park in the Gaza Strip as a potential investment location for both traditional manufacturing and technology-oriented industries vis-à-vis its potential competitors in the Middle East.

Companies tend to place their production facilities in locations that can offer a macroeconomic framework conducive to private enterprise, and whose comparative endowments most closely match their own industry requirements in order to minimize production and transaction costs per unit of output. While the specific factors required by an individual company vary from industry to industry, international companies often conduct a broad, cross-sectoral benchmark evaluation in the early stages of their site-selection process.

The location audit/competitive benchmarking exercise is designed to assess the relative assets and liabilities of the REP from an investor's point of view. The process includes a series of general comparisons to regional competitor locations in factors most likely to shape the corporate location decisions of potential investors. Wherever possible, the analysis focuses both on the REP's current comparative position for a given factor, as well as issues or trends that may affect its competitiveness over time. The outcome is a clear picture of the REP's comparative advantages and disadvantages as a platform for investment.

The factors selected for evaluation include:

- Human Resources
  - labor skills availability
  - labor costs
- Land and Utilities
  - Availability and cost of serviced land and factory buildings
  - Availability and costs of electricity
  - Availability and cost of water
  - Availability and cost of waste disposal
  - Quality and costs of telecommunications

- Transportation Infrastructure
  - Sea transportation facilities and costs
  - Air transportation facilities and costs
  - Ground Transportation facilities and costs
- Investment Environment
  - Investment Risk Profile
  - Taxation and Investment Incentives
- Market Access

It must be noted that not all factors have an equal degree of influence on investment decisions. Small differentials in wages or utility tariffs may have only a marginal impact on investor decision-making when compared to the effects of a lack of access to key export markets. The cumulative effect of these various factors will be addressed in the conclusion.

The benchmarking exercise uses a cross-sectoral approach, i.e. without reference to specific industry requirements. Some factors are crucial to certain industries and, at the same time, may have little relevance for others. While the overall weighting of the selected factors will be conducted on a broad basis, the relevance to specific industry categories will be indicated wherever possible.

The proposed REP is compared, when appropriate, to several locations in the Middle East region. The following sites, all of which have demonstrated a high degree of success in attracting inward investment, were selected for comparative purposes.

- **Al-Hassan Industrial Estate, Irbid, Jordan.** Al-Hassan industrial estate has been designated as a Qualifying Industrial Zone, providing it with duty-free access to the United States – a designation which has attracted new investments, particularly in light manufacturing industries. Al-Hassan was completed in 1991 and today is fully occupied. With a new expansion underway, the industrial estate will cover 63 hectares upon completion.
- **Matam Technology Park, Israel.** Matam R&D Park is located in Haifa, at the heart of Israel's main industrial and technological region. Today, it is the largest technology park in

Israel, with 4,500 employees and 45 hi-tech companies including Elron, Microsoft, Intel and IBM. More than 50 percent of the park's tenants are engaged in computer-related industries, including both hardware components and software development.

- **Jebel Ali Free Zone, Dubai, United Arab Emirates (UAE).** The Jebel Ali Free Zone is host to more than 1,300 companies from 70 countries. Of the registered companies in the Jebel Ali Free Zone, 70 percent are active in trade and distribution, 25 percent in manufacturing, and 5 percent in services. Jebel Ali's superior transportation infrastructure and strategic location make it a favorable manufacturing and services hub, servicing the Middle East, Asian and European markets. Multinational companies include Sony, Aiwa, Black & Decker, Nissan, Honda, Coleman, Estée Lauder, Grundig, Colgate Palmolive, IBM, and Samsung.
- **Aegean Free Zone, Turkey.** The Aegean Free Zone - founded near Izmir, Turkey's second largest city and port - is the first privately developed and operated free zone in Turkey. To date, more than 220 hectares—out of a total of 500 hectares of serviced land—have been fully developed, with industrial, commercial and warehousing facilities. The zone houses nearly 500 companies; forty percent of firms located in the zone are production oriented. Foreign investors active in the zone include Hyundai, Samsung, Delphi Packard, FTC, Lockheed, Vestelcom, Karstadt, and Merloni.
- **Port Said Free Zone, Egypt.** The Port Said Free Zone is strategically located on the Mediterranean Sea at the northern entrance to the Suez Canal, providing its tenants with easy access to Europe. While Port Said has had only limited success in the past, in terms of attracting foreign investment, its ongoing rehabilitation and expansion efforts will provide an improved environment for investment.

It should be noted that the data collected for analysis includes a combination of location-specific, as well as countrywide statistics. Wherever possible, location-specific data was used. However, countrywide data was used instead when either: a) it was the most appropriate for the given factor (e.g. trade policy, investment incentives, etc.); b) or no location-specific data was available.

### 3.2 Human Resources

The availability and cost of labor is an important factor in the site selection process, whether the need is for low-skilled labor for assembly operations or high-skilled labor, such as engineers, for technology-oriented activities.

#### *Labor Skills and Availability*

The combined population of the West Bank and the Gaza Strip totaled approximately 2.9 million in 1997, with more than 1 million residing in the Gaza Strip.<sup>1</sup> The size of the potential labor force (population aged 15 and older) is relatively small in comparison, equivalent to less than 50 percent of the Gaza Strip's population. In turn, the active labor force in the Gaza Strip numbers a mere 186,000, or 18.6 percent of the Gaza population.

In terms of industry experience, the Gazan economy is largely service oriented, with less than 15 percent of those employed engaged in manufacturing. The figure is even lower for the southern governorates near Rafah, where only 10 percent of employees are engaged in manufacturing industries. By occupation, professionals, managers, and technicians constitute 23 percent of the Gaza Strip labor force. The remainder of those working are employed in low-skilled and semi-skilled positions as farmers, machine operators, assemblers, shop workers, etc.

There are only two technical colleges in Gaza, the College of Science and Technology at Khan Younis and the Palestine Technical College at Deir Albalah. In 1998, 130 students were enrolled in engineering-related programs and 275 in IT-related programs. On the other hand, there are a significant number of university graduates with engineering-related experience. While there are three universities in the Gaza Strip, only one, Islamic University, offers a wide variety of engineering and computer science programs, in which 875 were enrolled in 1998 (35 in computer science, 840 in various engineering disciplines). Al-Azhar University enrolled an additional 90 students in its computer science program.

<sup>1</sup> All demographic and labor data is derived from official statistics published by the Palestinian Central Bureau of Statistics, including *The Demographic Survey in the West Bank and the Gaza Strip, Final Report* (August 1997), *Labour Force Survey, Annual Report: 1997* (October 1998), and *Labour Force Survey: Main Findings* (March 1999).

However, only a very small proportion of graduates enter the manufacturing sector. For example, in plastics, only one in three workers have completed high school, and only two percent have any university-level training. The dominance of “low technology” industries in the current economy and the young age of the population suggest a shortage of the kinds of technical skills and experience that are typically acquired on the job in economies that are based on more technology-dependent industries.

Despite its small size and relative lack of formal training, the Palestinian manufacturing labor force is among the most productive in the region, given its level of development. As demonstrated in Table 3.1 below, productivity levels in the indicated industrial sectors, measured by value-added per employee, are higher in WBG than in Jordan and Egypt.<sup>2</sup> These high productivity levels are, in part, a result of the Palestinians long history of participation in the Israeli manufacturing sector.

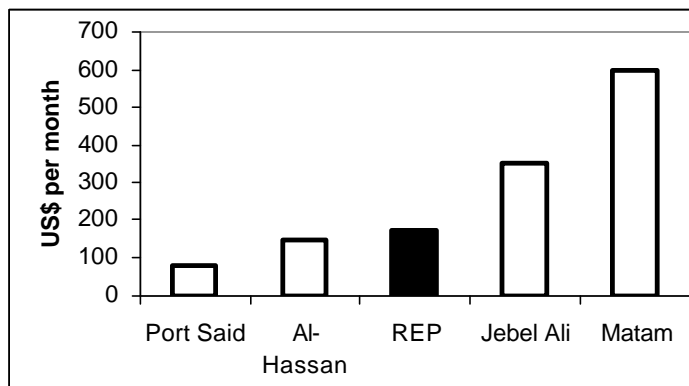
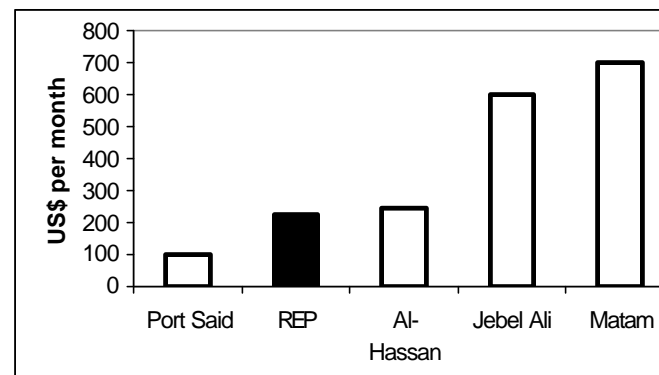
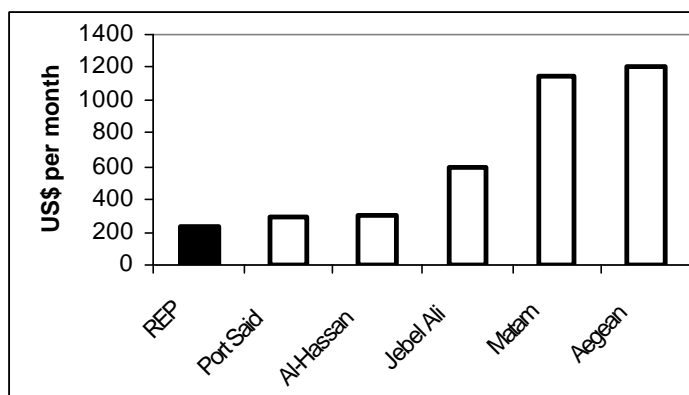
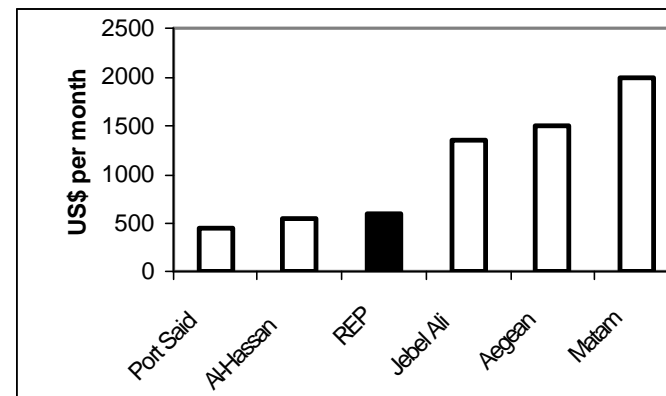
**Table 3.1: Comparative Productivity Levels (Gross Value-added per Employee, US\$)**

	Israel (1996)	Turkey (1997)	UAE (1985)	WBG (1997)	Jordan (1997)	Egypt (1995)
Food Products	29,176	25,816	14,333	<b>9,679</b>	7,069	5,380
Apparel	16,046	13,979	6,947	<b>5,009</b>	4,733	3,978
Plastic Products	41,981	63,289	15,905	<b>13,681</b>	8,300	3,406
Machinery, Electric	58,070	62,018	18,485	<b>28,079</b>	12,293	7,588
Furniture	24,456	20,377	9,553	<b>6,615</b>	4,934	2,301
Fabricated Metal Products	32,285	28,483	12,707	<b>7,558</b>	5,335	3,057

### Labor Costs

Labor costs in the Gaza Strip, while not the lowest in the region – wages are lower in Port Said and Al-Hassan, with the exception of engineers’ salaries – are more competitive than Matam and the Jebel Ali and Aegean Free Zones, where wage levels are substantially higher (see Figures 3.1 to 3.4). For instance, for

<sup>2</sup> Derived from UNIDO database of *Country Industrial Statistics* and PCBS, *Industrial Survey – 1997: Main Results* (December 1998).

**Figure 3.1: Average Salary Levels for Unskilled Workers (US\$ per month)****Figure 3.2: Average Salary Levels for Skilled Workers (US\$ per month)****Figure 3.3: Average Salary Levels for Technicians (US\$ per month)****Figure 3.4: Average Salary Levels for Engineers (US\$ per month)**

skilled workers, wage levels in the Gaza Strip are 2 to 3 times higher than at Al-Hassan and 8 to 10 times higher than in Port Said, but only a fraction of wage levels in Matam or Jebel Ali, where wage rates are 2 to 3 times higher. Similar wage differentials exist for other skill levels.

*Implications for Investment* The proposed REP, with its pool of productive labor, is in a good position to attract inward investment in industries that can take advantage of this skilled labor force. While wage rates are higher in Gaza for lower-skilled labor categories, vis-à-vis competing locations such as Egypt and Jordan, Gaza is more cost-competitive in skilled labor categories. In addition, the Palestinian workforce has benefited substantially from its historical ties to Israeli industry, which has resulted in relatively high productivity rates vis-à-vis lower-cost production centers, such as Egypt and Jordan, which, in turn, reduce overall labor costs per unit of output.

### 3.3 Land and Utilities

The provision of fully serviced industrial estates can provide a strong incentive to investors, reducing the time and effort required to establish a physical presence and providing cost savings through various incentive schemes and, in some cases, concessionary land and utility rates.

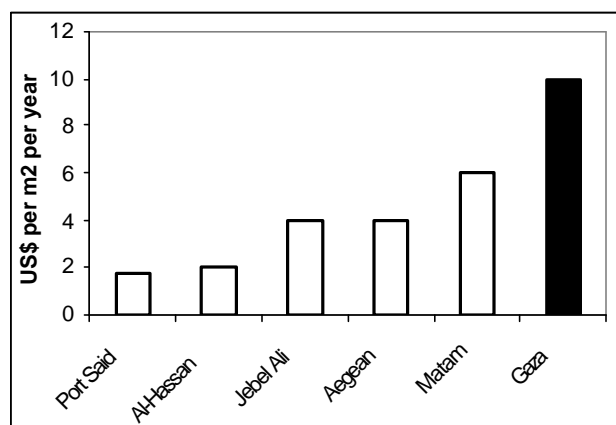
#### *Serviced Land and Factory Space*

Serviced industrial land is in short supply in the Gaza Strip and has hindered the expansion of local industries, many of which are located in mixed zones, hemmed in by residential and/or commercial developments. The absence of serviced industrial zones has also deterred investment by Israeli and other investors concerned with security. The Gaza Industrial Estate was the first fully serviced industrial park in WBG. Since it became operational, the GIE has succeeded in attracting both local and Israeli investors eager to expand their operations. The REP is the second industrial estate to be planned in the Gaza Strip and will provide investors with an alternative location with unique attributes, including a secure operating environment. In terms of costs, the virtual absence in the past of a free market for land in the Gaza Strip makes it difficult to gauge the market

value of land in Rafah. Therefore, for the purposes of this analysis, land and building costs in the GIE are used as proxies.

Overall, land and building lease rates are relatively high in the Gaza Strip when compared to alternative investment locations in the region (see Figures 3.5 and 3.6).<sup>3</sup> The lease rate for serviced land in the GIE is US\$10 per square meter per year, significantly higher than most of the other locations evaluated in the region. Serviced land is approximately one-half the price in the Jebel Ali and Aegean free zones and one-quarter the price in Port Said, Al-Hassan, and Matam.

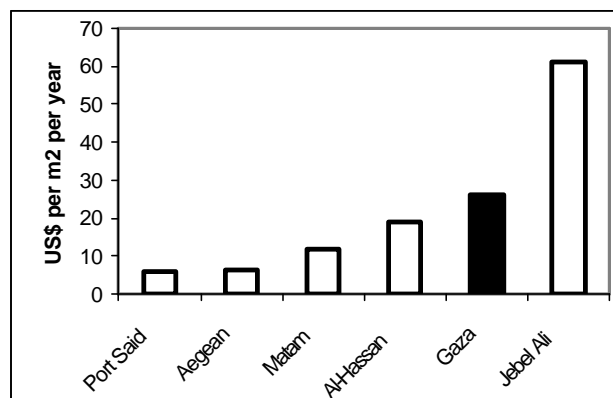
**Figure 3.5: Average Cost of Serviced Land**



The lease rate for standard factory shells are also relatively high in Gaza compared to many of the other locations under evaluation, where leases are offered at concessionary rates. Factory lease rates are US\$26 per m<sup>2</sup> per annum in the GIE, compared to an average US\$19 in Al-Hassan, US\$6.50 in the Aegean Free Zone, and a low US\$6 in Port Said. Only in Israel and Jebel Ali are factory spaces more expensive - lease rates in these two locations

<sup>3</sup> Land and building costs collected by TSG from relevant promotional agencies and other published data.



**Figure 3.6: Average Cost of Manufacturing Space**

average, respectively, US\$54 and US\$61 per square meter per annum (however, these lease rates cover the costs of a wide spectrum of services and amenities).

In terms of construction costs, the Gaza Strip is competitive with the other regions under evaluation, ranging from US\$130 to US\$200 per m<sup>2</sup> for the construction of factory space, depending on materials (steel versus concrete), comparable to average rates in Matam (US\$200 per m<sup>2</sup>), Al-Hassan (US\$220 per m<sup>2</sup>) and Jebel Ali (US\$175 per m<sup>2</sup>).

#### Implications for Investment

The prospect of high cost of land and building leases in the REP, based on existing rates in the GIE, can discourage investment, particularly from small, local investors. In order to maximize potential investment into the REP, land and buildings will need to be more competitively priced, more in line with free market rates and alternative locations in the region.

#### Utilities

Most enterprises, both manufacturing- and service-oriented, are dependent to some degree on the availability of cheap and reliable utilities. Frequent breakdowns and "pre-modern" services can hamper production and, thus, profitability.

**Electricity**

Gaza-based industries have long suffered the lack of adequate power infrastructure. While some manufacturers have installed their own generators to meet their energy needs, others operate far below their production capacity. In addition, power cuts are a regular occurrence, often resulting from the inability of local authorities to meet their payment obligations. The Gaza Strip is currently supplied with electricity from Israel through 11 high-tension lines (two of these are dedicated to the Israeli settlements within the Gaza Strip). Only one high-tension line serves the Rafah area, which includes the airport. The Palestinian Energy Authority has indicated that the existing line is overloaded and does not have the capacity to meet the expected demand in the REP.

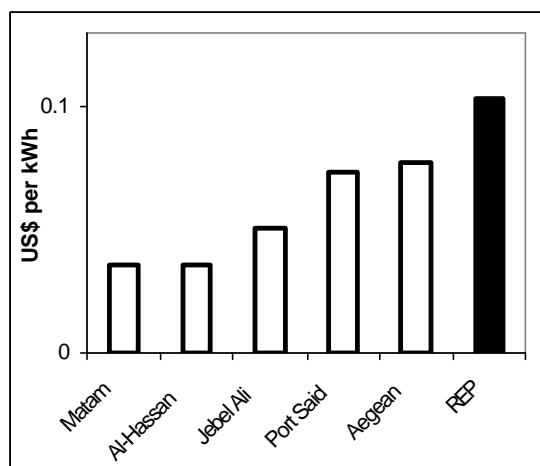
A new power generation plant (Gaza Power Plant) is currently under construction in Gaza and is expected to be completed by the end of 2000. The first phase of the power plant is 48 MW, but it is not clear which part of the Gaza Strip will benefit from this additional supply. A substation has been proposed in the Rafah area (in close proximity to the Sufa Crossing), which will include two lines with 24 MW of capacity for the REP. However, the implementation of this plan is pending the operation of the Gaza Power Plant. Therefore, in order to meet the short-term demands of the REP, other power sources will be required. Options include a direct connection to the Israeli grid or on-site generators. These options will be fully evaluated in Chapter 6 of this report.

In terms of costs, electricity rates in the Gaza Strip are relatively high when compared to the other locations under evaluation. The cost of electricity in the Gaza Strip is higher than all the other locations under review – in some cases as much as three times higher.<sup>4</sup> In the Gaza Strip, the cost of electricity is approximately US\$0.10 per kWh (peak hours), for both small and large industrial users. In Matam and Al-Hassan industrial estates, the costs of electricity to large industrial users are US\$0.033 and US\$0.036, respectively. Small industrial and commercial users face similar cost differentials (see Figures 3.7 and 3.8 below).

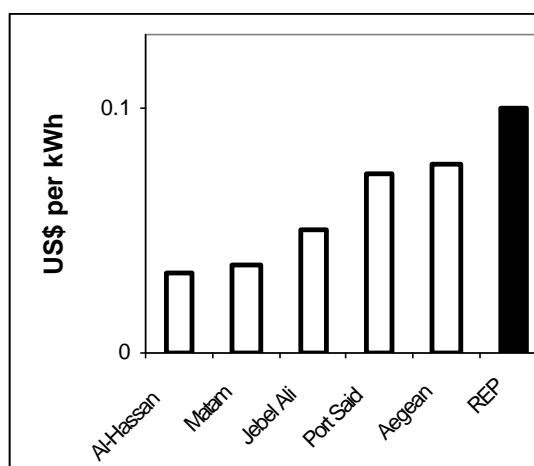
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<sup>4</sup> Electricity rates collected by TSG from relevant promotional agencies and other published data.

**Figure 3.7: Average Electricity Tariff Rates for Small Commercial and Industrial Users**



**Figure 3.8: Average Electricity Tariff Rates for Industrial Users**

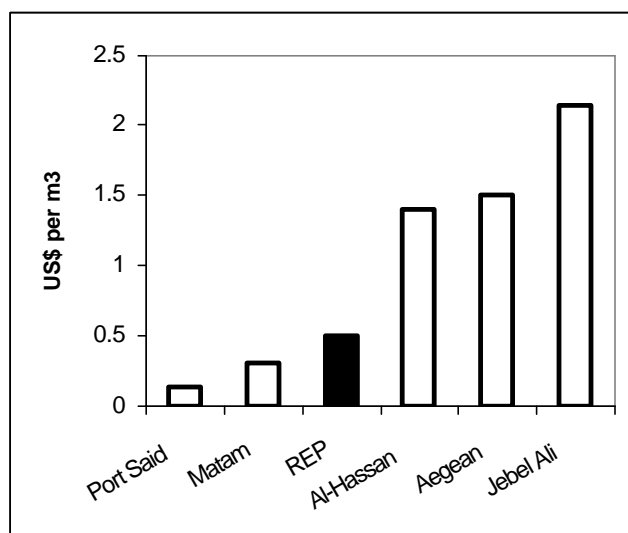
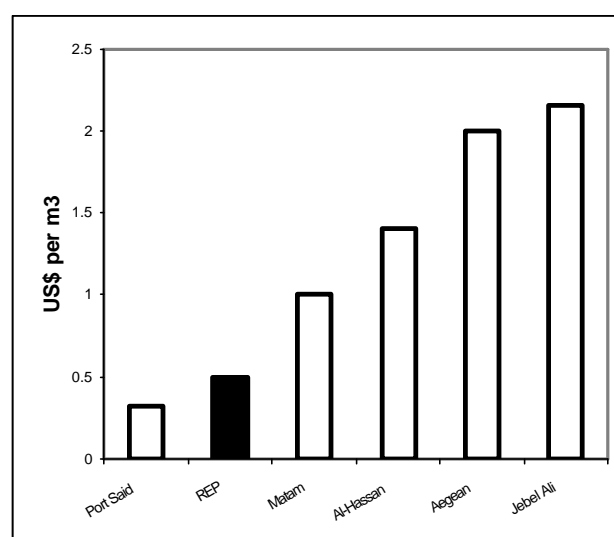


#### Water

Like the electricity supply infrastructure, water supply infrastructure in the Gaza Strip is inadequate for large-scale industrial development. In the Rafah area, water is supplied by Mekerot, an Israeli water supply utility. As with electricity, the failure of local governments to meet their payment obligations occasionally results in the shut off of water supplies by Mekerot. While a new well was drilled in the El Hashash area near Rafah to supply the airport, which currently only uses a portion of its capacity, it is not likely to be available to the REP. The REP will either have to obtain its water through a new connection to Mekerot or through a new well.

Despite ongoing water shortages in the Gaza Strip, tariff rates are competitive with most of the other locations under evaluation in the region (See Figures 3.9 and 3.10).<sup>5</sup> Mekerot supplies water to bulk consumers at US\$0.50 per m<sup>3</sup>. Water tariff rates are highest in the Aegean and Jebel Ali free zones, averaging US\$2.00 and

<sup>5</sup> Water tariff rates collected by TSG from relevant promotional agencies and other published data.

**Figure 3.9: Average Water Tariff Rates for Small- to Medium-Size Users****Figure 3.10: Average Water Tariff Rates for Large-Size Users, US\$ per m<sup>3</sup>**

US\$2.15 in each respective location. However, water tariffs are lowest in Port Said, where water is heavily subsidized by the Egyptian government; tariffs average a low US\$0.13 per m<sup>3</sup>.

#### Waste Disposal

Like water and electricity infrastructure, the infrastructure for both wastewater and solid waste collection are inadequate throughout most of the Gaza Strip.

The area around the REP is not served by a conventional sewage system. In the city of Rafah, only 35 percent of the population is served by a sanitation system. Raw sewage is discharged to a treatment plant at Tel-Sultan, which is currently overloaded. The Palestinian Water Authority has launched a program to establish a new treatment plant for Khan Younis and Rafah. Construction is expected to start in 2001. Should the completion of the new treatment plant be delayed, a treatment plant will have to be constructed for the REP.

In terms of costs, many locations in the Gaza Strip do not impose any running fees (or they are built into water costs) and installation costs are relatively low, averaging US\$140 per connection. The

GIE imposes running fees based on actual usage (US\$0.57 per m<sup>3</sup>), which is lower than Al-Hassan industrial estate, where usage fees average US\$0.75 per m<sup>3</sup>.

In terms of solid waste disposal, there is a landfill that serves the Rafah Governorate, which has the capacity to be expanded and should be sufficient to meet the needs of the REP. In addition, there is a hazardous waste landfill in Gaza City that serves the entire Gaza Strip, including Rafah. Collection fees for solid waste vary from location to location in the Gaza Strip. Fees are highest in the GIE, where fees are based on usage (US\$70 per truck).

#### Telecommunications

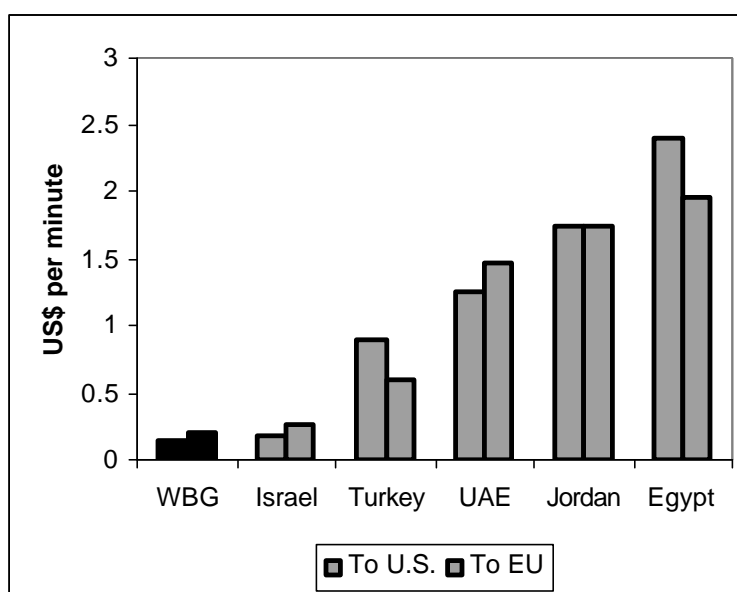
The quality and cost of telecommunication services is fast becoming an important factor in investment location decisions. As enterprises become more global in scope, a well-developed communications network is often required to ensure smooth operations. In addition, state-of-the-art telecommunications infrastructure is indispensable for certain technology-oriented industries, such as information technology, that are dependent on access to “virtual transportation” and often look to industrial estates to supply the necessary services.

The Palestinian Telecommunications Company (Paltel) is the major service provider in WBG. It has a sole license for 20 years to construct and operate all telecoms services, with the exception of satellite communications, which are still open to competition. Paltel is in the process of upgrading the local telecoms network that will include a new international gateway at Ramallah, upgraded backbone infrastructure, and expanded services throughout WBG. Currently, Paltel has no international switches of its own and must instead rely on Israeli infrastructure. Both leased lines and international direct dialing is routed through Bezeq’s system (Bezeq is one of Israel’s three telecommunication companies). Paltel’s planned upgrades will reduce the current reliance on Bezeq.

The overall picture for telecommunications is that improved telecoms services are on the way from Paltel. However, the Ministry of Posts and Telecommunications regulates the pricing for Paltel’s services, which can impede Paltel’s ability to provide competitively priced services.

While direct dialing rates<sup>6</sup> to locations outside the region are relatively cost competitive, as demonstrated in Figure 3.11 below, direct dialing rates from the Gaza Strip to its Arab neighbors are inordinately high, ranging from US\$0.69 per minute to Jordan to US\$0.99 per minute to Egypt to US\$1.20 to most other countries in the region. In the future, however, the Ministry hopes to reach an agreement with four Arab countries (Jordan, Egypt, Sudan and Qatar) to utilize their exchanges for inter-regional calls, which could reduce prices by up to 30 percent.

**Figure 3.11: Average IDD Tariffs to U.S. and Europe (peak rates)**

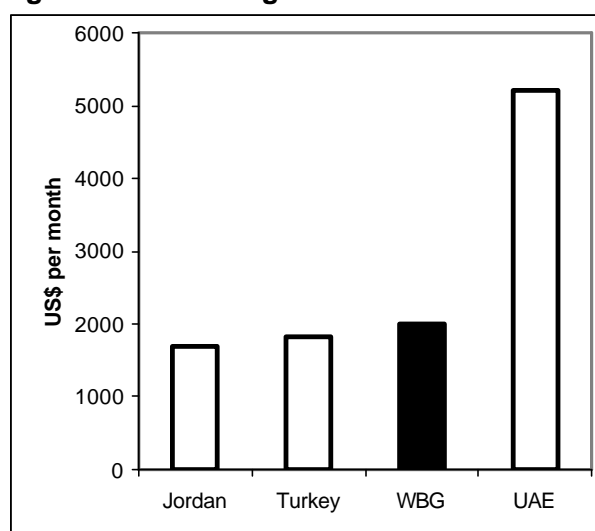


While direct dialing rates to the U.S. and Europe are relatively competitive, the cost of dedicated leased lines are substantially higher than in most of the alternative investment locations (see Figure 3.12). While Paltel must negotiate on behalf of individual companies with Bezeq for international leased line connections, on average a half-circuit 64 kbps line to the U.S. would cost a

<sup>6</sup> Telecommunication tariffs derived from information provided by Paltel and the First Status Report for the IT Strategy.

Rafah-based enterprise approximately US\$2,000 per month, only slightly higher than costs in Jordan and Turkey, but still very high by international standards. Only in Dubai are leased line costs higher than in WBG, averaging US\$5,200 per month for a 64 kbps line. Similar price differentials apply to other international destinations, as well as different access speeds. However, the Ministry indicated that improvements in WBG's telecoms infrastructure will likely be followed by improvements in their pricing policies.

**Figure 3.12: Average Tariffs for Leased Lines to U.S.**



**Implications for Investment** Gaza's manufacturing industries have long suffered from the lack of adequate utilities infrastructure, forcing them to work far below capacity. The REP has the opportunity to provide Gaza-based industries with high quality, reliable utilities infrastructure. However, any utility infrastructure solutions for the REP should also consider the impact on tariff rates, particularly for electricity, which can negatively impact the cost competitiveness of REP-based industries.

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### 3.4 Transportation Infrastructure

Because most foreign-owned operations and enterprises in developing economies are export-oriented and are also dependent on the import of capital equipment and raw materials, access to cheap and reliable transportation services can impact the ability of enterprises to meet their production requirements.

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#### *Sea Transportation*

Currently there is no seaport in the Gaza Strip. A new port is being planned 35 kilometers north of the REP. In the short term, however, imports to and exports from companies operating in the REP would need to go through Ashdod Port across the Green Line, 50 kilometers from the REP. Ashdod is currently operating at full capacity, which frequently translates into delays at anchor. In addition, Palestinian goods are often subject to additional delays as a result of Israeli security checks, which are required on all imports to and some exports from the Gaza Strip (and the West Bank).

While regular seaport handling and freight charges are the same for both Palestinian and Israeli cargo, which are competitive with most other locations in the region (see Table 3.2 below), there is an extra \$80-\$120 charge for security inspections of Palestinian goods. Additional warehousing fees are sometimes required due to delays. A recent study concluded that Palestinian companies exporting through the port of Haifa face higher costs (18 percent) and longer delays (20 percent) than comparable Israeli companies. Similarly, Palestinian importers incur higher costs (11 percent) and experience much longer delays (52 percent) than Israeli companies. Palestinian importers and exporters face similar costs and delays at Ashdod Port. In addition, many Palestinian producers have suffered damage to their goods as a result of the security inspections. These barriers can add significantly to the transaction costs for businesses operating from the Gaza Strip. Sea transportation costs for Port Said in Egypt are the most economical, given the port's strategic location on the Suez Canal.



**Table 3.2: Sea Transportation Costs (per 20' container)**

	Port Said, Egypt	REP, Gaza Strip	Matam Tech Park, Israel	Jebel Ali Free Zone, Dubai	Aegean Free Zone, Turkey	Al Hassan IE, Jordan
Nearest Port	Port Said	<b>Ashdod Port</b>	Haifa Port	Jebel Ali Port	Izmir Port	Aqaba Port
Average port handling charges (US\$)	65	<b>120 (30+80 for security inspection)</b>	30	110	75	95
Average sea freight rates (US\$)						
New York	750	<b>1450</b>	1450	1750	1800	2500
Rotterdam	500	<b>400</b>	400	800	750	650

Sources: TSG surveys of freight forwarders and cargo handlers in the selected locations.

### *Air Transportation*

The REP is expected to benefit from its close proximity to the Gaza International Airport. Although the Gaza International Airport in Rafah is equipped to handle cargo, the lack of customs controls and equipment means that the airport only serves passenger traffic. Given the absence of cargo operations, REP-based enterprises would have to rely on Israeli facilities to meet their import and export needs for the immediate future.

All airfreight to or from the Gaza Strip currently goes through Ben Gurion Airport near Tel Aviv, 80 kilometers north of the REP site. Regular airfreight charges are the same for both Palestinian and Israeli goods and are relatively high compared to most of the other locations under evaluation (see Table 3.3). Freight rates to both New York and Amsterdam are cheapest from Al-Hassan Industrial Estate, followed by the Jebel Ali and Aegean free zones. However, Palestinian exporters moving airfreight goods through Ben Gurion airport experience even higher costs (39 percent) and delays (78 percent) than Israeli goods due to security checks.

In addition to the higher airfreight rates, goods originating from the Gaza Strip must exit Israel on cargo planes, as transportation on

passenger planes, except for small packages, are not permitted due to security reasons. Consequently, both the cost of and the time required for air transport are closely related to the availability and destination of cargo planes. Re-routing, due to unavailable equipment or direct connection to a destination, usually results in higher than usual costs and longer duration of transport.

**Table 3.3: Air Transportation Costs** (US\$ per kg, for packages in excess of 100kg)

	Al-Hassan IE, Jordan	Jebel Ali Free Zone, Dubai	Aegean Free Zone, Turkey	REP, Gaza Strip	Matam Tech Park, Israel	Port Said, Egypt
Nearest Airport	Queen Alia, Amman	Dubai Airport	Izmir Intl. Airport	<b>Ben Gurion, Tel Aviv</b>	Ben Gurion, Tel Aviv	Cairo Airport
New York	1.50	1.70	1.95	<b>2.80</b>	2.80	3.00
Amsterdam	0.80	1.05	0.85	<b>1.50</b>	1.50	1.40

Sources: TSG surveys of freight forwarders and cargo handlers in the selected locations.

### Ground Transportation

The REP will be located in close proximity to the main north-south road, Road No. 4, that transverses the Gaza Strip and is sufficient to carry any truck traffic to the REP, though new access roads will be required to connect the REP with Road No. 4, as well as the airport and the nearby Sufa Crossing on the Green Line.

Currently, the Karni crossing, located 40 km north of the REP and adjacent to the GIE, is the main checkpoint for all commercial goods entering or exiting the Gaza Strip to/from Israel. The checkpoint is operated by the Israeli Port Authority. No Customs officials are present at the crossing as the primary purpose of the checkpoint is security. Israeli security procedures have included back-to-back loading procedures (i.e. for goods entering the Gaza Strip, off-loading from Israeli trucks and re-loading onto Palestinian trucks, and vice versa for goods exiting the Gaza Strip). For GIE-based companies, a new arrangement has been reached, allowing for joint checks on factory premises and the elimination of back-to-back loading procedures. It is expected that REP-based companies will receive similar treatment. The introduction at Karni of new x-ray machines that can check entire containers will greatly facilitate the movement of goods in and out of the Gaza Strip. However, 'Terminal Fees', which currently run between US\$45 (for industrial estate –based companies, which will include REP) and US\$90 (other Gaza locations) per truck, can

greatly increase the cost of ground transportation between the Gaza Strip and Israel or the West Bank.

*Implications for Investment* The difficulties associated with the import and export of goods from the Gaza Strip can strongly impact the attractiveness, in the short-run, of the REP as investment location for particular activities, such as those that depend on the rapid movement of goods, for instance “just-in-time” manufacturing and location-based services such as warehousing and logistics.

While the construction of the Gaza Port (which is not expected to be completed in the short-term) and the introduction of cargo operations at Rafah Airport (which is more likely to happen in the short-term) would relieve some of the logistical difficulties facing REP-based enterprises, the ongoing presence of Israeli Customs control and their required security inspections would continue to hamper the importing and exporting operations of these companies.

### **3.5 Investment Environment**

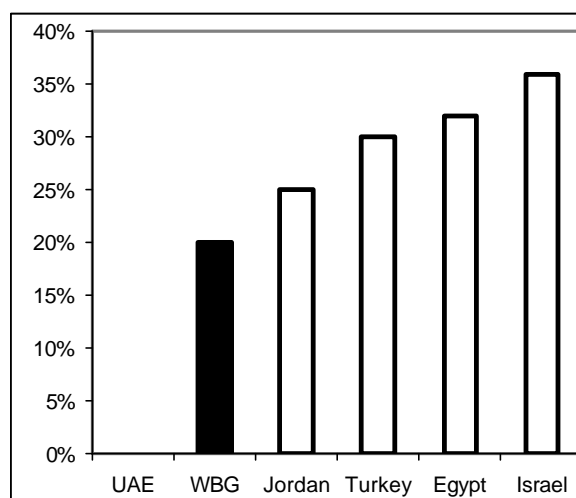
Issues such as taxation, investment restrictions, and foreign exchange regime all form part of the regulatory framework in which businesses operate. A “business-friendly” environment boosts business confidence and attracts investment. In addition, incentives - such as tax relief schemes and duty exemptions - can provide an additional inducement to investors. Although not sufficient by itself to attract investors, incentives can “sweeten the pot” if the fundamentals are in place.

The PA places a high priority on encouraging foreign investment in WBG in order to promote growth, reduce unemployment, and support reconstruction efforts that began in 1994. The 1998 Law for the Encouragement of Investment guarantees the free transfer of all financial resources out of WBG, including capital, profits, dividends and gains. There are no restrictions governing foreign currency accounts or official currency transfer policies. The law also prohibits expropriation and nationalization of approved foreign investments, and provides free transfer of ownership.

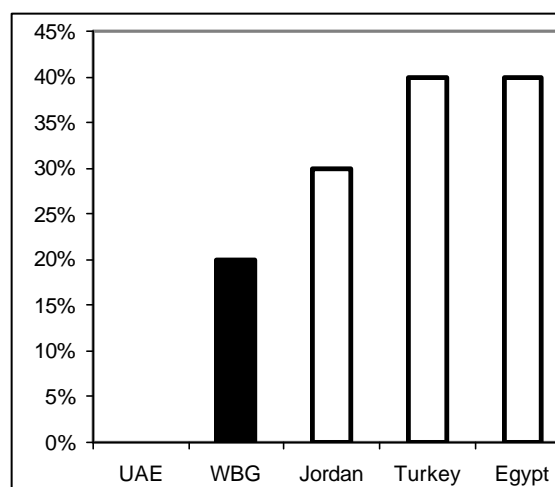
**Taxation and Incentives****Income Tax**

The new Palestinian income tax law imposes a flat corporate income tax rate of 20 percent on net income earned in the Gaza Strip and/or West Bank, which replaces the 38.5 and 35.7 percent tax rates previously imposed in the West Bank and Gaza Strip, respectively. The 20 percent flat tax rate is substantially lower than the corporate income tax rates in the other locations under review, with the exception of Jebel Ali. A graduated personal income tax is imposed in four bands – 5, 10, 15, and 20 percent. The highest personal tax bracket in WBG is significantly lower than personal income tax rates in all the other locations, with the exception, once again, of Jebel Ali. See Figures 3.13 and 3.14 below.

**Figure 3.13**  
**Average Corporate Income Tax Rates**



**Figure 3.14**  
**Personal Income Tax Rates** (based on the highest tax brackets in each location)

**Incentives**

The new Encouragement of Investment Law of 1998 offers a broad range of investment incentives through tax exemptions. Tax exemptions are granted for 5 years, with reduced rates for additional years, the duration of which is determined by the value and/or nature of the project.

In addition, investors in the proposed REP, which falls under the purview of PIEFZA, will benefit from additional incentives that are provided for in a Memorandum of Understanding between PIEFZA and the Ministry of Finance, under provisions in the 1998 Industrial Estates and Free Zones Law, including:

- Any income generated by projects in the industrial estates will enjoy a seven year tax holiday (versus five years for those investments located outside one of the industrial estates), with partial exemptions thereafter, as follows:
  - Any investment project with a paid-up capital between US\$100,000 and US\$1,000,000 is taxed at a rate of 10 percent on net profits for eight additional years;
  - Any investment project with a paid-up capital between US\$1,000,000 and US\$5,000,000 is taxed at a rate of 10 percent on net profits for 12 additional years;
  - Any investment project with a paid-up capital exceeding US\$5,000,000 is taxed at a rate of 10 percent on net profits for 16 additional years; and
  - Any investment project deemed to be "special", either by its nature or value, is taxed at a rate of 10 percent on net profits for 20 additional years.
- Projects that source 60 percent of their components from the local market can benefit from an additional three-year tax exemption.
- All exemptions may be extended by up to five years based on economic or export performance.
- In addition, "special" incentives may be granted to local investors.

As demonstrated in Table 3.4, the REP can provide an investment environment that is relatively competitive with the other locations, with lower corporate tax rates and longer tax

## Rafah Enterprise Park Feasibility Study

**Table 3.4: Taxation and Incentives**

	WBG	Israel	Egypt	Jordan	Dubai	Turkey
	REP	Matam Tech Park	Port Said Free Zone	Al Hassan IE	Jebel Ali Free Zone	Aegean Free Zone
<b>Taxation</b>						
Corporate Income Tax Rate	20%	10-25 for "Approved Enterprises"; 36% for Others	32% on exports; 40% other	15-35%	0%	30%
Personal Income Tax	5-20%	10-50% (max US\$4,600)	40%	5-30% (max US\$22,400)	0%	15-40% (max US\$109)
Activities Eligible for Preferential Treatment	All	All	All	Manufacturing, Tourism	not applicable	All
Minimum Capital Requirements	US\$100,00 for tax incentives	None	not available	US\$70,000	None	US\$100,000 (US\$50,000 for R&D)
Tax Holidays	7-10 yrs + reduced rate of 10% for 8-20 yrs, depending on size/nature of investment	2-10 years, depending on location	5-20 years if foreign capital FZ: 100% exempt Industry: 5 yrs	25-75% reduction for 10 yrs (none for services) IE: 12 yrs FZ: 12 yrs	not applicable	Aegean: 100% exemption
<b>Duty-free Privileges</b>						
Types of Operations Qualified for Duty-Free Privileges	All	not applicable		Not services	All	
Types of Goods Granted Duty-free Treatment	Fixed assets & Spare parts	None		Fixed assets & Spare parts IE: fixed assets & spare parts FZ: all goods	All goods	
<b>Other</b>						
Foreign Ownership Restrictions	No limits for companies in PIEFZA industrial estates or free zones	For "Approved Enterprises", foreign ownership determines tax rate	None	50% max in selected sectors	None	Limited to 20% in broadcasting and 49% in aviation & maritime transportation
Repatriation of Profits	Yes	Yes	Yes	Yes	Yes	Yes
Foreign Exchange Controls	Exempt	Exempt	Exempt	Exempt	Exempt	Exempt

Sources: From official publications of relevant national and local promotion agencies.

holidays than most of the locations, with the exception of the Aegean and Jebel Ali free zones, where corporate income is tax-free.

#### Double Taxation

While Palestinian income tax rates are relatively competitive with the other locations under review, the Palestinian Authority will need to coordinate internationally if it is to effectively facilitate foreign investment. The Ministry of Finance indicated that it is currently in the process of negotiating a double taxation agreement that includes a tax sparing provision with the United States, and hopes to negotiate a similar agreement with European Union countries. The Ministry hopes to complete both within one year.

The Ministry of Finance is also actively working to clarify the tax relationship with Israel and Israeli investors. While the Paris Agreement calls for the development of procedures to address double taxation,<sup>7</sup> this has not been accomplished to date. Under the agreement, both sides have the right to impose direct taxes on 1) economic activities within their respective areas, and 2) residents of their respective areas, even when those residents conduct economic activity on the other side. At present, taxes paid in WBG are credited against tax liabilities arising in Israel.

#### Duty-free Privileges

Projects located within the REP will also benefit from duty-free privileges. The fixed assets of the project are exempt from custom duties provided that they are brought in or imported within a set time frame. The spare parts, valuing up to 15 percent of capital and imported by the investing enterprise, are also exempt from customs duties. Such duty-free privileges are more favorable than in Matam Technology Park in Israel, where no duty-free privileges are offered to park-based projects, but falls short of the privileges offered in many of the other locations under review, which operate as free zones, providing a wider range of duty-free privileges.

While the PIEFZA law provides for the creation of free zones, with extended duty-free privileges for export processing, including duty-free imports of all equipment and materials, the free zones program cannot be implemented until proper customs control is in

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<sup>7</sup> Article V, paragraph 5.

place. If and when the free zones program is implemented, the duty-free privileges, at least for export-oriented projects, will be competitive with locations such as the Jebel Ali and Aegean free zones, thereby providing a more favorable investment environment for REP-based companies.

#### Implications for Investment

The PA, with the passage of the Encouragement of Investment and Industrial Estate and Free Zones laws has created a positive environment for inward investment. While the lack of double taxation agreements and tax sparing provisions eliminates the tax holiday incentives granted to foreign investors in the investment and PIEFZA laws, those holidays are of limited duration. When coupled with the already low corporate income tax rate applied in WBG, the potential tax sparing benefit that could accrue to a foreign (and especially an Israeli) investor are not very large, though efforts to negotiate such agreements should continue). The planned implementation of the free zones program, with its extension of duty-free privileges, will further enhance the attractiveness of the REP's investment environment.

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#### Political Risk

While taxation and incentives can help to provide an attractive investment environment, investors also look for a degree of political stability when selecting a site for investment. Investors must be reasonably assured that future governments will not reverse the commercial and investment policies that attracted them in the first place. In addition, companies must be assured that their investments will be safe physically from political or civil unrest. This is particularly important for those industries requiring substantial capital investments, such as heavy industry and other types of capital-intensive manufacturing.

WBG is located in a region of the world that is generally considered to be a moderate-risk environment. However, WBG's unique political circumstances, and those of the Gaza Strip in particular, can create a perception of high political risk. PA government investment policies – including guarantees against confiscation, the right to repatriate profits, and freedom from exchange rate controls – can provide a level of stability in areas over which the PA has political autonomy. However, other issues, such as the status of land and trade policies, remain outside the



#### Implications for Investment

powers of the PA and ongoing uncertainty can dampen investor interest. In the short-term, investor perceptions will largely be driven by the progress of the ongoing peace process – the outcome of which will lead to the resolution of such issues.

While the existing level of political uncertainty can negatively impact on investors, a focused image awareness campaign can lessen the negative effects. As mentioned above, PA government investment policies – including guarantees against confiscation, the right to repatriate profits, and freedom from exchange rate controls – can create a perception of stability, at least in certain areas. In addition, investment guarantees offered by bilateral or multinational organization's, such as the United States' Oversea Private Investment Corporation (OPIC), the World Bank's Multilateral Investment Guarantee Agency (MIGA), and the Inter-Arab Investment Guarantee Corporation can provide investors with the security they desire. Any promotional campaign should stress these benefits.

### 3.6 Market Access

A *Euromoney* magazine survey of multinational corporations - including leading players in FDI from Asia, Europe and North America - identified access to foreign markets, for exports, as the single most critical factor affecting the investment location decisions, and, therefore, the flow of FDI. While access to domestic markets played an important role for location decisions in the past - in an era of highly protected markets - new investments are largely driven by access to regional or global markets for exports as sourcing opportunities and just-in-time manufacturing/inventory techniques become more widespread.

In addition, both export-oriented and domestic market-oriented investors are strongly impacted by access to imports from abroad. In a small country with few natural resources and a small industrial base, such as WBG, many domestic producers are dependent on imports of raw material and intermediate inputs. Consequently, both low tariff walls at home and access to free or preferential trade opportunities can both provide a strong incentive to investors.

*Domestic Trade Policies*

At present, the PA is severely circumscribed in its authority to liberalize its trade regime by its membership in a customs union with Israel through the Paris Agreement. The agreement does not give the PA the power to decrease import tariffs, only to increase with them, with the exception of specified capital equipment, as well as specified items from other Arab countries in the region.<sup>8</sup> For the bulk of WBG's international trade, tariffs and non-tariff barriers (NTBs), including import licensing and standards, are the same across the customs union territory and are determined unilaterally by Israel.

A key issue to be resolved during the final status negotiations is whether WBG should remain in the customs union, or whether WBG should establish an independent customs territory that may or may not be part of a Palestinian-Israeli free trade area. Whatever the outcome of those negotiations may be, it appears to be generally recognized that the small Palestinian economy has the most to gain from an open and liberal trade regime, including liberal and open trade with Israel – whether in the form of a customs union, a free trade area, or an independent trade regime. However, in the short term, it can be expected that the impediments imposed by the customs union will remain in effect.

In addition to import licensing and product standards requirements provided for in the agreement, other NTBs impede Gaza export activities and constrain access to imported materials. As discussed in section 3.4, a recent study concluded that Palestinian companies exporting through the port of Haifa face higher costs and longer delays than comparable Israeli companies.

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<sup>8</sup> Lists A1, A2, and B provided for in Article III.

## Rafah Enterprise Park Feasibility Study

*Preferential Access to Markets*

WBG benefits from liberal market access to its main trading partners. The most important market access agreements are summarized in Table 3.5 below.

Several of these agreements represent extensions of existing free trade agreements that WBG's trading partners have already established with Israel. Some agreements expand duty-free access to WBG as an extension of agreements with Israel, while others have been negotiated exclusively with the PA. The agreement with the United States is even more complex in that the U.S. executive branch negotiated the agreement with the PA, but the U.S. Congress only recognizes it as part of the U.S.-Israel free trade agreement.

**Table 3.5: Market Access Agreements**

Partner	Agreements with WBG	Agreements with Others
<b>Israel</b>	<b>"Customs Union" Member</b> No trade barriers, full access to Israeli market	Jordan and Egypt have preferential access for some goods
<b>Europe</b>	<b>EU Association Agreement (Euro-Med Partnership)</b> Duty-free access for industrial products, quota access for agricultural goods; EU-Palestinian free trade area planned for 2001 <b>EFTA Declaration of Economic Cooperation</b> Duty-free and quota-free access for industrial products; EFTA-Palestinian free trade area planned	Jordan, Egypt and Turkey have similar agreements with EU
<b>United States</b>	<b>Duty-Free Access Agreement</b> Duty-free access for all products	Israel has duty-free access for all products; Jordan has duty-free access under QIZ program
<b>Canada</b>	<b>Canadian-Palestinian Framework for Economic Cooperation &amp; Trade</b> Duty-free access for all products	Israel has a similar agreement with Canada
<b>Jordan</b>	<b>Protocol Trade Agreement</b> Duty-free access for 60 products	Israel and Egypt have preferential access for some goods
<b>Egypt</b>	<b>Technical and Economic Cooperation Accord</b> Preferential access for some goods	Israel and Jordan have preferential access for some goods
<b>Saudi Arabia</b>	<b>Free Trade Agreement</b> Duty-free access for all products	Jordan has agreement removing NTBs, but no reduction in tariffs

Regardless of the legal structure of these agreements, it is apparent that producers at the Rafah Enterprise Park will have duty-free access to the vital Israeli, European, and North American markets. Given the political will on the part of the international community to support WBG, it is highly likely that access to Europe and the North America will continue under whatever trade regime WBG finally adopts following final status negotiations. However, as demonstrated in Table 3.1, a number of the other investment locations under evaluation benefit from similar levels of preferential access to these markets.

*Implications for Investment* Free access to regional and international markets provide significant opportunities to any investors locating at the REP. WBG has entered into a number of trade agreements, which provide REP-based producers with preferential access to North American, European, and regional markets. While others in the region – including Israel, Egypt and Jordan – have similar access to some of these markets, only WBG can offer such comprehensive access to the major export markets.

However, the PA's lack of independence in setting import tariff rates and the numerous NTBs facing WBG-based enterprises can negatively impact investment, particularly small local producers that sell primarily to the domestic market.

### **3.7 REP's Strengths and Weaknesses**

The foregoing sections, through a comparative analysis, focused on a number of factors that generally shape the site-selection decisions of investors. The result is a clear picture of the REP's advantages and disadvantages as a potential investment center.

The preceding analysis evaluated each selected factor independently and on a cross-sectoral basis. The following sections provide a summary of the results of this analysis, and also put these factors in a context that illuminates the West Bank and Gaza Strip's potential to attract investment into broad industry categories, given its advantages and disadvantages. Table 3.6 provides a summary, factor-by-factor, of the REP's competitive position, relative to the selected comparator locations in the Middle East region.

Table 3.6: Comparative Benchmarking Summary

Competitive Factors		
▪ Availability of <b>high-skilled, productive workforce</b> – more productive than Egypt, Jordan, Turkey and Dubai	▪ <b>Airport Infrastructure and Facilities (Ben Gurion and GIA)</b> – high quality comparable with others in region	▪ <b>Preferential market access</b> to U.S., Europe and region, though access shared by others as well
▪ <b>Sea Transport Costs</b> among lowest in region	▪ <b>Seaport Infrastructure and Facilities (Ashdod)</b> – high quality comparable with others in region	▪ <b>Power Infrastructure (Israeli grid)</b> – high quality comparable with others in region
Moderately Competitive Factors		
▪ <b>Telecommunications Infrastructure</b> on par with Egypt and Jordan, though not competitive with Israel	▪ <b>Investment Incentives</b> – on par with most other locations in the region, though not competitive with Jebel Ali and Aegean free zones	
Uncompetitive Factors		
▪ <b>Labor costs</b> – though lower than Israel and Turkey, significantly higher than Egypt and Jordan	▪ <b>Water Infrastructure</b> – water shortages shared by Israel and Jordan	▪ <b>Political Risk</b> – higher perceived risk than others in region due to uncertain political status
▪ <b>Cost of Electricity</b> higher than other locations	▪ <b>Cost of Water</b> higher than all other locations, except Jordan	▪ <b>Import/Export Procedures</b> – longer delays than others in region
▪ <b>Cost of Air Transport</b> higher than Jordan, Egypt and Dubai	▪ <b>Cost of Advanced Telecommunications</b> higher than others for advanced services	▪ <b>Cost of Land and Building</b> higher than Israel, Jordan, Egypt and Turkey

The comparative benchmarking study reveals that the REP possesses several of the key locational requirements for successful industrial development:

- **REP is an attractive platform for exporters to North American, European and regional markets.** The REP benefits from trade agreements that provide WBG-based producers with preferential access to North American, European, and regional markets. While others in the region – including Israel, Egypt and Jordan – have similar access to some of these markets, only WBG can offer such comprehensive access to the major export markets.
- **REP offers a growing pool of skilled and productive workers at competitive labor rates.** REP can offer investors a growing pool of skilled workers who have direct experience

in a more advanced industrial economy (*i.e.* Israel) across a wide spectrum of industry sectors. While wage rates are higher in Gaza for lower-skilled labor categories, vis-à-vis competing locations such as Egypt and Jordan, Gaza is more cost-competitive in higher skill categories. In addition, the Gaza workforce has benefited substantially from its historical ties to Israeli industry, which has resulted in relatively high productivity rates vis-à-vis lower-cost production centers, such as Egypt and Jordan, which, in turn, reduce overall labor costs per unit of output.

- **REP will have access to world-class transportation infrastructure.** The REP, given its proximity to Israel, has access to high-quality transportation (including Ashdod seaport and Ben Gurion airport). In addition, while it is unlikely that the Gaza Port will be completed within the next two to three years, it is likely that the cargo facilities at the new Gaza International Airport will become operationalized, enhancing the REP's access to external markets.
- **REP will provide fully serviced industrial space in a secure environment.** Gaza industry has been constrained over the years by the lack of serviced industrial facilities with inadequate utilities infrastructure. The provision of such infrastructure in the REP will resolve one of the most pressing issues that have served to constrain the development of local industries. In addition, the REP's location along the Green Line with Israel will provide Israeli investors with a more secure, closure-proof investment environment, the absence of which has deterred Israeli investment into Gaza in the past.

In order to maximize the REP's potential to attract foreign investment, however, government policies as well as the REP environment itself, can mitigate against some existing comparative disadvantages:

- **Perceptions of political risk need to be allayed.** WBG is located in a region of the world that is generally considered to be a moderate-risk environment. However, Gaza's unique political circumstances can create a perception of high political risk. PA government investment policies – including

guarantees against confiscation, the right to repatriate profits, and freedom from exchange rate controls – can provide a level of stability in areas over which the PA has political autonomy.

- **Bilateral agreements are required to ensure that investors benefit from favorable investment incentives.** Overall, the investment environment of the REP is relatively competitive with most of the other locations under review, particularly in terms of corporate and personal taxation and related incentives. However, the conclusion of double taxation agreements with Israel, the U.S. and key European countries will be required in order to ensure that foreign investors can benefit fully from these incentives.

However, there are a few key factors in which the REP is likely to maintain a comparative disadvantage:

- **Gaza is, in general, a relatively high-cost production center.** Production costs are, in general, higher in Gaza than in Egypt and Jordan, including the costs of lower-skilled labor, electricity, water, land and building, sea transport, and advanced telecommunications. While these costs can be allayed, to a certain extent, within the industrial estate environment, the REP is likely to remain a higher cost production center than Egypt and Jordan.
- **Import/export procedures can negatively impact investment.** The difficulties associated with the import and export of goods from the Gaza Strip can strongly impact the attractiveness of the REP as an investment location for particular activities, such as those that depend on the rapid movement of goods, for instance “just-in-time” manufacturing and location-based services such as warehousing and logistics. While the construction of the Gaza Port (which is not expected to be completed in the short-term) and the introduction of cargo operations at Rafah Airport (which is more likely to happen in the short-term) would relieve some of the logistical difficulties facing REP-based enterprises, more streamlined procedures will be required to ensure the efficient movement of goods.

- **Water shortages limit investment potential in selected sectors.** Gaza, like much of the region, is constrained in its development by a lack of adequate water resources. Therefore, the level of water use, as well as environmental impact, of certain industries would be incompatible with the need to conserve this scarce resource.

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*Implications for Investment*

Given the REP's comparative advantages and disadvantages, the REP is likely to attract investment into those sectors that can take advantage of one or more of the following attributes:

- **Preferential access to key export markets.** The REP will benefit from preferential market access to U.S., European, and regional markets, including Israel, making it a promising platform for export-oriented industries.
- **Competition based on quality more than cost.** Competition in the marketplace is driven by both quality and cost, to varying degrees, depending on the product. Given the relatively high factor costs in Gaza, the REP is more likely to attract investment in niche product categories that compete more on quality than cost. In general, the more differentiated the product, the more it tends to compete on quality rather than cost.
- **A high proportion of skilled labor.** A focus on niche industries producing higher quality, differentiated products, in turn, points to the need to focus on industries utilizing a relatively high proportion of skilled labor. In addition, Gaza's wage rates in the higher skilled labor categories are more competitive with others in the region.
- **Gaza linkages with Israeli industry.** Gaza has the unique advantage, vis-à-vis lower-cost production centers such as Egypt and Jordan, of direct participation in and experience with a dynamic and modern industrial base. Many Gaza workers have been trained in Israeli industry and have been exposed to higher levels of technology and industry requirements. The REP can take advantage of its historical ties to Israeli industry to forge links with industry across the



Green Line, including both Israeli companies and Israel-based multinationals.

- **Do not depend on rapid transportation by sea.** Given the present delays associated with importing and exporting, in the short-term, the REP will not be able to meet the requirements of just-in-time production or other industries that depend on the efficient movement of goods, particularly those dependent on sea transport. While there is potential in the short-term that Rafah's air cargo facilities will become operational, the lack of a seaport will be an ongoing impediment. Therefore, industry targeting should focus on those niche activities that do not depend on the timely movement of goods via sea transportation for success.

The above analysis points to particular types of niche activities that should be the focus of the industry targeting analysis. The following provides an overview of the implications for three broad industry categories: light industry, professional services and location-based services.

## 4. Demand Assessment

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### 4.1 Project Vision

The REP is envisioned to provide a new and unique investment environment in Gaza. While the GIE has been designed, and has largely succeeded, as a standard industrial estate environment for the location of light industries, the REP is envisioned to provide a unique environment that fosters skills development, technology transfer, and further development of exports.

Gaza-based producers have historically experienced tremendous export barriers, resulting in a relatively small manufacturing base, low levels of technology, and the production of goods geared toward the local market. Presently, the vast majority of manufactured products by Gaza-based enterprises are destined for local markets (Gaza Strip and West Bank). Only 31 percent of WBG's industrial output goes to external markets; 97 percent of these exports go to Israel, and only 3 percent go to other external markets (based on 1998 PCBS data). Value-added in the Palestinian manufacturing sector is a meager 3.6 percent of total output. The EDC is envisioned to play an important role in improving Gaza's industrial base by catalyzing the development of new enterprises and the expansion into new, higher value-added product areas, the introduction of new production know-how, and, ultimately, the production of export-quality goods.

This demand assessment focuses on the 14-hectare EDC and the first 50-hectare phase of the REP's industrial park component (the rationale for the size and phasing of the different REP components is described in detail in Chapter 6). In order to test the feasibility of the REP, TSG developed a methodology to identify the most promising industries and sources of demand for the REP, and to project this demand over time. The following sections present the methodology and the results of the demand assessment.

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## 4.2 Overview of Methodology for REP Demand Assessment

The methodology for projecting demand for the proposed REP consists of a 4-step process:

- **Step 1 – Identification of Target Industry Sectors.** The first step of the demand assessment process requires the identification of the industry sectors that could best take advantage of the REP location, given the site's assets and liabilities - as presented in the location audit/comparative benchmarking exercise in Chapter 3 of this study – and an analysis of competitive industry trends that favor the REP's location.
- **Step 2 – Identification of Potential Sources of Investment.** This step of the demand assessment process is carried out in parallel with Step 1. The identification of the most promising sources of investment is based on the analysis of competitive industry trends in the target sectors in different geographical regions. The result is the prioritization of different group of investors, by geographic location and by industry.
- **Step 3 – Targeted Demand Surveys.** The third step requires a survey of companies in the target industry sectors in the priority geographic locations identified in steps 1 and 2 in order to validate and gauge the degree of interest in the REP as an investment location, and to identify particular issues (both positive and negative) that can be addressed through a targeted promotional campaign or that require policy reforms.
- **Step 4 – Analysis of Survey Results.** The fourth step of the process includes an analysis of the survey results and extrapolation of demand, over time, for space in both the Enterprise Development Center and industrial park property at the REP.

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### **4.3 Target Industry Sectors and Potential Sources of Investment**

The identification of target industry sectors and investment sources is based on a three-phase screening process designed to evaluate selected industry sectors on a wide range of criteria, including industry factor requirements, international and regional competitive market trends, and policy objectives.

The comparative screen evaluates the match between specific industry factor requirements and the location attributes of the REP, which is derived from the location audit/comparative benchmarking exercise presented in Chapter 3 of this study.

Once it is firmly established that a particular product or service can be produced in a cost-effective manner in the West Bank and/or the Gaza Strip, it must be determined whether the location is attractive as a production platform vis-à-vis the global and/or regional competitive environment. Each industry is evaluated on the basis of a variety of competitive market trends, including:

- Basic supply and demand trends;
- Strategic decision-making regarding customer bases, manufacturing integration, sourcing requirements, and production scales;
- Recent investment flows;
- Barriers to entry in the location under examination; and
- Backward linkages, such as the presence of intermediary input suppliers, supporting industries, local research and development capacity, or training centers.

The methodology's final screen compares each industry's structure and characteristics with a set of policy objectives formulated for the REP. This step allows policy makers to rank industries that are good candidates for promotion into the REP in a way that ensures consistency with government objectives that go beyond attracting investment. Following discussions with PIEFZA and representatives from the Ministry of Economy and Trade, Ministry of Industry, and Ministry of Planning and

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International Cooperation, it was decided that this screen should target those industries that:

- increase exports;
- foster the development of technology;
- foster employment generation; and/or
- are environmentally friendly (low pollution, low water use).

The first two criteria are especially important for targeting appropriate sectors for the Enterprise Development Center.

The following sections provide a summary of the target industries and sources for investment into the REP. The identification of these targets is derived from comprehensive research on conducted by TSG for the Investor Targeting Strategy (ITS) developed for PIEFZA,<sup>1</sup> based on the above methodology, as well as original research for this feasibility study (also based on the above methodology). A more detailed presentation of the sector analyses can be found in the ITS report.

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*Food Processing*

The food processing sector is a promising target for promotion into the REP, with both comparative and competitive trends in its favor.

In terms of overall industry requirements, the REP can provide a favorable location for food processing, particularly for products based on local agricultural production (citrus, tomatoes, herbs) and confectionary and bakery products. Table 4.1 below provides an overview of the REP's relative position as an investment location.

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<sup>1</sup> The Services Group, *Investor Targeting Strategy for Industrial Estates in the West Bank and Gaza*, prepared for USAID and PIEFZA, November 1999.

**Table 4.1: Factor Requirements for the Food Processing Industry**

Factor	Requirements	Conditions in REP	Outcome
Labor Availability	Require pool of experienced factory producers, as well as low-skilled workers	Access to pool of trained and low-skilled labor	Positive
Labor Costs	Important – need to be competitive with alternative production locations	Labor costs relatively competitive with other locations in region, particularly Israel	Positive
Access to Raw Materials	Requires access to consistent supply of raw materials	Raw material supply not consistent in Gaza, but can be supplemented by Israeli raw materials	Neutral
Market Access	Requires access to large market	Large combined Israeli-Palestinian market	Positive
Technical Support Services	Relatively important for repair and maintenance of machinery and equipment	Growing supply of trained technicians, plus access to Israeli technical support services	Positive
Electricity	Reliable, relatively low-cost power supply required	Possible to provide reliable, power supply, but at higher cost than others in region	Negative
Water	Relatively important	Not competitive	Negative
Telecommunications	Not very important	-----	Neutral
Transportation	Low-cost transportation is relatively important	Ground transportation is relatively expensive due to security	Negative
Land & Buildings	Relatively important	Industrial parks provide serviced land and ready-built facilities, but at relatively high cost	Neutral
<b>OVERALL</b>			<b>Positive</b>

Potential sources for investment, based on competitive industry trends, include the following:

- **Expansion and Improvement of Local Industry.** The food processing sector in Gaza is comprised of approximately 500 producers, accounting for 13 percent of all manufacturing establishments and 10 percent of all manufacturing employment. The sector is the second largest contributor to industrial output, second only to construction materials. Despite the sector's large size, only 10 percent of

establishments employ more than 8 workers and only 50 percent are valued at more than US\$100,000. Gaza's food processing industry is oriented primarily toward bakery products and other confectionaries; other major sectors include animal feeds and cereal products. Locally-derived vegetable and fruit products only make a very small share. As a result, more than 75 percent of inputs are imported (more than half from Israel). Virtually all output, on the other hand, is consumed locally (71 percent in Gaza, 21 percent in West Bank). Exports to Israel have been low due to local manufacturers' inability to meet Kosher and other production standards. The REP can provide Gaza's food processing industry with a more favorable environment, providing new opportunities to access the Israeli market (by facilitating Kosher approval) and exposure to new production technologies, which will enhance their abilities to produce to export-quality products. New product areas are likely to take advantage of local (and Israeli) agricultural production, including citrus products (juices, essential oils, etc.), tomato-based products and processing of medicinal and culinary herbs.

- **Potential outsourcing/offshore production by Israeli producers.** The food processing sector is one of the largest industries in Israel, comprising more than 1,000 establishments and employing more than 54,000 workers. The food processing sector accounted for US\$8.7 billion in output, including US\$435 million of exports. The food processing sector is well-diversified, with production covering the full range of sub-sectors. However, like other traditional manufacturing sectors in Israel, the food processing sector is coming under increasing competitive pressures as labor costs rise. The REP can provide an attractive location for Israel-based food manufacturers seeking to reduce production costs. The location's proximity to the Green Line will facilitate kosher certification, ensuring that REP-based producers will maintain their market share in Israel. In addition, the REP can provide access to otherwise unattainable Arab markets. The most promising sectors are those that can take advantage of existing industry experience (confectionaries and baked goods) and local agricultural production (see above).

- **Limited potential from other sources.** International investment tends to be driven by interest in capturing new markets or capturing production of more exotic or specialized agricultural inputs that are unavailable in their home markets. In the short-term, investment from other sources is likely to be less prominent though investments by Israel-based MNCs may lead the way for other FDI in the future. The food processing sector in Israel is host to a number of MNCs, including Nestle, Kraft, Bestfoods, Coca Cola, Pepsi Cola - these companies are more likely “FDI” targets in the short-term than companies without a presence in Israel.

#### *Consumer Electronics and Electrical Appliances*

The electronics and electrical appliance sector is a promising target for investment promotion into the REP, with both comparative and competitive trends in its favor.

In terms of overall industry requirements, the REP can provide a favorable location for the consumer electronics and electrical appliance sector, particularly for manufacturing and repair/maintenance activities. Table 4.2 below provides an overview of the REP’s position.

Competitive market trends also strongly favor investment by consumer electronics and electrical appliance manufacturers in the REP. Key trends include the following:

- **Proximity to a large and growing electronics sector in Israel, which is experiencing growing competitive pressures.** The electronics sector is one of the faster growing industries in Israel. While a significant proportion is oriented toward military, aerospace and satellite communications, a large proportion of this US\$4.4 billion industry (55 percent in the case of components) is oriented toward consumer applications. Electrical appliances account for another US\$120 million of production. Israel also supplies 25 percent of its market for civilian telecommunications equipment. Domestic pressures, primarily from rising wage rates, have been gradually eroding the industry’s competitiveness. While the Israeli electronics sector has been



**Table 4.2: Factor Requirements for Consumer Electronics and Electrical Appliance Industries**

Factor	Requirements	Conditions in REP	Outcome
Labor Availability	Qualified electronic and electrical engineers, technicians, and skilled labor	Relative supply of engineering graduates and technicians. Few with higher levels of expertise (for product design and engineering).	Positive
Labor Costs	Important – need to be competitive with alternative production locations	Relatively cost competitive vis-à-vis other Middle East locations	Positive
Market Access	Relatively important, for both import (production sharing) and exports (final goods)	Preferential access to leading regional and international export markets	Positive
Supporting Industries	Important to supply components, parts and technology	Limited in Gaza, but available in Israel	Positive
Technical Support Services	Relatively important for repair and maintenance of machinery and equipment	Growing supply of trained technicians, plus access to Israeli technical support services	Positive
Electricity	Reliable, relatively low-cost power supply required	Possible to provide reliable, power supply, but at higher cost than others in region	Negative
Water	Not very important	-----	Neutral
Telecommunications	Relatively important	Good quality infrastructure available, with low international dialing rates (outside region)	Positive
Transportation	Low-cost, timely transport of incoming materials and outgoing finished products is of high importance	Delays in importing and exporting, as well as added costs for security checks required by Israel	Negative
Land & Buildings	Relatively important	Industrial parks provide serviced land and ready-built facilities, but at relatively high cost	Neutral
<b>OVERALL</b>			<b>Positive</b>

relatively slow to move production offshore, due to the sensitive nature of much of its output, a growing number of firms are turning to overseas locations to control costs and focus their Israel-based operations on product design and

engineering rather than manufacturing and assembly. In 1998, more than US\$375 million of overseas investments were made by the Israeli electronics sector.

- **A large regional market for electronics and electrical appliances, with potential for import substitution.** The consumer electronics and electrical appliances industry is dominated by manufacturers in Europe, Asia, and the United States. Denmark, Italy, the U.S., Japan and Korea top the list of sources of regional imports. These top countries, and their leading manufacturers, represent the most promising opportunities for investment in the region, based on the potential for regional import substitution. In terms of product categories, leading imports into the region include: major white goods (clothes washers and dryers, refrigerators, dishwashers), small kitchen appliances, televisions and radio receivers, vacuum cleaners, personal care appliances (shavers, hairdryers), telephone sets, and some office appliances (photocopiers, adding machines).
- **Growing interest in multinational “point-of-sales” plants in the Middle East region to replace imports.** Many of the leading consumer electronics and appliance manufacturers are already moving to supply the region through “point-of-sale” manufacturing and assembly plants throughout the Middle East. Most significant is the recent agreement reached between Samsung, Korea’s leading consumer electronics and appliance manufacturer, and the Palestine Electronic and Electrical Company (PEEC). Other recent investments in the region indicate that other leading consumer electronics and electrical appliance manufacturers are following similar strategies.

Given the supply of relatively low-cost, qualified labor in Gaza - combined with preferential access to the Israeli, Egyptian and Jordanian markets - these trends point to the strong potential for the REP to attract both Israeli and multinational investment in the electronics and electrical appliance sector, with a focus on those products that are already being imported into or manufactured in the region.

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*Textiles and Apparel*

The textiles and apparel sector is a promising target for promotion into the REP, with both comparative and competitive trends in its favor.

In terms of overall industry requirements, the REP can provide a favorable location for the textiles and apparel sector, particularly spinning and weaving of textiles and the production of finished sewn goods. Table 4.3 provides an overview of the REP's position.

**Table 4.3: Factor Requirements for Textiles and Apparel Industries**

Factor	Requirements	Conditions in REP	Outcome
Labor Availability	Qualified labor needed only for high-end production	Large supply of experienced garment workers	Positive
Labor Costs	Very important – labor intensive industry	Relatively cost competitive vis-à-vis Middle East locations	Positive
Market Access	Very important, particularly to U.S. and EU markets	Preferential access to U.S. and EU markets	Positive
Electricity	Relatively important, particularly for textiles manufacturing	Possible to provide reliable power supply, but at higher cost than others in region	Positive
Water	Relatively important for printing & dyeing, not important for other activities	Not competitive due to water shortages	Negative for printing/dyeing textiles Neutral for others
Telecommunications	Not very important	-----	Neutral
Transportation	Low-cost, timely transport of incoming materials and outgoing finished products very important	Not competitive - delays in importing and exporting, as well as added costs for security checks required by Israel	Negative
Land & Buildings	Availability of ready-built facilities relatively important	Industrial parks provide land and ready-built facilities	Positive
<b>OVERALL</b>			<b>Positive</b>

Competitive market trends also strongly favor investment by textiles and apparel manufacturers in the REP. Key trends include the following:

- **Local Industry Sub-Contractors.** Gaza has a large concentration of textile and apparel manufacturers, which accounted for approximately 27 percent of all manufacturing establishments and 43 percent of all manufacturing employment in 1998. Gaza textiles and apparel manufacturers have a long history of ties to Israeli manufacturers, primarily through subcontracting arrangements, which require easy communications and fast delivery of raw materials and end products between Israeli producers and Palestinian subcontractors. The majority of Palestinian apparel manufacturers operate – at least in part – as subcontractors to Israeli companies. Some sources estimate that up to 90 percent of garment workshops operate as subcontractors.<sup>2</sup> Most of these subcontracting arrangements have limited Palestinian contribution to the overall production process to sewing and some finishing and packaging, while Israeli contracting companies carried out the higher value-added activities, such as cutting and marketing. The REP can provide a more favorable environment to local textile and apparel producers and can open new opportunities to expand existing subcontracting arrangements and the development of new partnerships with Israeli manufacturers.
- **Proximity to a large textiles and apparel industry under competitive pressure.** The Israeli apparel market – comprised of 1,500 companies - is estimated to be US\$ 2.86 billion, with US\$1.14 billion (approximately 40 percent) of output, destined to world export markets.<sup>3</sup> Like other traditional sectors in Israel, the textiles and apparel manufacturing industries have come under increasing competitive pressures in recent years due to rising wage

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<sup>2</sup> Textile and Garment Association in the West Bank; and Development Resource Center (DRC), Garment Industry in the Gaza Strip. Extracted from Nasr, Mohamed, *The Impact of the Peace Process on the Textile and Garment Industry in Palestine*, November 1997.

<sup>3</sup> Israel - The Apparel Market 1999, U.S. International Trade Administration Report

costs. Traditionally, minimum wage industries, such as textiles and apparel manufacturing, were located in developing towns where generous government financial incentives were available. Today, the industry is relocating its manufacturing facilities to neighboring countries (WBG, Turkey, and Jordan) in order to meet the increasing international competition from the low-wage producers, concentrating at home on design and marketing activities. Average apparel sector wages in WBG (US\$400 per month) are only a fraction of Israel's (US\$1100 per month) – a substantial cost-savings for Israeli manufacturers.

While wages are somewhat lower in Jordan and Egypt, as outlined in the previous section, Palestinian productivity levels tend to be substantially higher, thereby mitigating the somewhat higher labor costs in Gaza.

The REP has the opportunity to build on the local textiles and apparel sectors' long-standing relationship with Israeli industry to forge new relationships, such as joint ventures, enabling local industry to move from subcontracting to partnerships, where full production – from design and cutting to finishing – is carried out by the REP-based joint venture.

In addition to Israeli produced textiles (for consumption by local industry), the specific niche apparel sectors that demonstrate the greatest potential for Israeli-Palestinian joint ventures are those high-value-added product areas where Israel already has a relatively high volume of exports, including:

- Men's or boys' trousers of woven textile fabrics;
- Men's or boy's shirts of woven textile fabrics;
- Women's or girls' trousers of woven textile fabrics;
- Women's or girls' blouses of knitted or crocheted textile fabrics;
- Women's or girls' lingerie, brassieres, panties, etc. of woven, knitted or crocheted textile fabrics; and
- Sweaters, knitted or crocheted.

- **Footloose investors in search of duty- and quota-free access to leading world markets.** China, Hong Kong, Korea, and Taiwan lead the world in the manufacture and export of apparel. While in the past the latter three countries focused almost exclusively on mass-market apparel, they are increasingly shifting towards higher-end market segments, as China and South Asia continue to absorb mass-market apparel investments. At the same time, Hong Kong-, Korea-, and Taiwan-based investors have set up factories in Western Europe, the United States, and Canada to gain better access to these markets.

WBG's preferential access to the United States and Europe, two of the key export markets for high-end apparel, provide the REP with a favorable factor for investment by apparel manufacturers. In addition, the REP's relative proximity to Europe can provide manufacturers an additional incentive, with lower transportation costs than from East Asia.

#### *Rubber and Plastic Products*

The rubber and plastic products sectors are promising targets for promotion into the REP, with both comparative and competitive trends in their favor.

As demonstrated in Table 4.4, the REP does provide a relatively favorable environment for investment in the rubber and plastic product sectors. Potential niche categories, given the existing level of technology and skills development in Gaza include: spare automotive and machinery parts, household goods, packaging materials, and building and construction materials.

Potential sources for investment, based on competitive industry trends, include the following:

- **Potential outsourcing/offshore production from Israeli manufacturers.** Israel has a dynamic and fast-growing rubber and plastics sector, which is expanding at an annual average rate of more than 15 per cent per annum. Total output in 1998 amounted to US\$ 2.3 billion, including US\$ 887 million in exports. Key product niches in Israel include advanced products, such as films and laminates, components for

precision products, composite body parts for jet aircrafts and weapon systems, as well as lower-tech applications, such as household, packaging and construction materials. The Kibbutzim, or rural collectives, in Israel account for 40 percent of the plastics industry and dominate the packaging sector in Israel, as a high proportion of output is destined to supply the agriculture and food processing industries.

**Table 4.4: Factor Requirements for Rubber and Plastic Products Industries**

Factor	Requirements	Conditions in REP	Outcome
Labor Availability	Requires pool of trained, skilled workers	Access to pool of trained labor, but experience limited to lower-value products	Positive
Labor Costs	Need supply of relatively cheap, low-skilled workers	Relatively cost competitive vis-à-vis Israel and other locations in region (once adjusted for productivity levels)	Positive
Market Access	Require access to large local market	Large combined Israeli-Palestinian market	Positive
Technical Support Services	Relatively important for repair and maintenance of machinery and equipment	Growing supply of trained technicians, plus access to Israeli technical support services	Positive
Electricity	Reliable, relatively low-cost power supply required	Possible to provide reliable power supply, but at higher cost than others in region	Neutral
Water	Not very important	-----	Neutral
Telecommunications	Not very important	-----	Neutral
Transportation	Low-cost transport (via land) of final product to markets is required	Local land transportation is expensive due to security	Negative
Land & Buildings	Desirable to have access to serviced land or ready-built facilities	REP will provide land and ready-built facilities	Positive
<b>OVERALL</b>			<b>Positive</b>

Like other traditional manufacturing industries, certain sectors of the plastic and rubber products industries (at the low-end of the value-added spectrum) have come under increasing

competitive pressures in Israel. The REP can offer a well-trained, lower-wage workforce to these sectors.

- **Potential for Upgrading and Expanding Local Production.**

Gaza has a well-established rubber and plastic products industry, which specializes in the production of construction materials, household products, and packaging materials for the agricultural industry. In 1997, there were a total of 47 establishments in Gaza, which employed 260 workers. The plastics sector accounts for most of employment. A small proportion of these workers were trained in Israeli manufacturing establishments. The limited consumption base within WBG has not enabled the industry to diversify and upgrade its output. Local rubber and plastics production is focused on low-tech, low-quality products with little potential for export. Approximately 90 percent of output is consumed locally (in WBG), with only 10 percent exported to the Israeli market. The REP can provide a more favorable environment for the development of Gaza's rubber and plastics sector by facilitating access and exposure to the large and more sophisticated Israeli market.

- **Limited potential from overseas manufacturers.** Given the low-value of the types of rubber and plastic products that are appropriate for production in the REP, given current technology and skills development, the site's attractiveness to investors outside Israel is very limited. Global investments are, instead, concentrated in high value-added sectors or locations that can opportunities for increased market share.

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### *Furniture*

The furniture sector is a very promising sector for the REP, with both comparative and competitive trends in its favor.

As demonstrated in Table 4.5, the REP does provide a relatively favorable environment for investment in the furniture sector. Potential niche categories, given existing experience and skills and technology development in Gaza include: mid-price range office furniture (including wood, metal and composite materials).



Potential sources for investment, based on competitive industry trends, include the following:

**Table 4.5: Factor Requirements for Furniture Manufacturing**

Factor	Requirements	Conditions in REP	Outcome
Labor Availability	Trained, skilled workers	Large supply of trained, skilled workers, capable of quality decorative carving	Positive
Labor Costs	Relatively important due to high labor intensity	Relatively cheap labor compared to Israel	Positive
Market Access	Relatively important. Close proximity important for lower-quality products.	Close proximity to Israeli market, plus preferential access to Israeli and Arab markets	Positive
Electricity	Somewhat important	Possible to provide reliable power supply, but at higher cost than others in region	Neutral
Water	Not important	-----	Neutral
Telecommunications	Not very important	-----	Neutral
Transportation	Cheap transportation to end-user markets	Ground transportation to Israel and WB is expensive	Negative
Land & Buildings	Desirable to have access to serviced land or ready-built facilities	REP will provide land and ready-built facilities	Positive
<b>OVERALL</b>			<b>Positive</b>

- **Expansion and Upgrading of Local Industry.** The furniture manufacturing industry is one of the largest sectors in Gaza, with more than 430 producers, accounting for more than 10 percent of all manufacturing establishments and approximately 8 percent of manufacturing employment. Local manufacturers produce home and office furniture of wood, metal, and composite materials. However, wood furniture dominates, accounting for the vast majority of output. Rattan furniture is a small niche market oriented toward the tourism sector (hotels and restaurants). While virtually all industry inputs are imported through Israel, virtually all output is sold on the local market (Gaza Strip and West Bank). Only a very small proportion is exported to Israel. The REP can play a valuable role in developing more export-oriented furniture production by

exposing local producers to international standards and facilitated access to the Israeli market.

- **“Offshore” Investment by Israel-based Manufacturers.** The Israeli furniture sector is comprised of more than 750 producers, with annual sales totaling more than US\$1.3 billion (1998), with the vast majority (98 percent) sold on the local market. The sector is fairly diversified, in terms of end-users (home versus office), quality, and materials. The office furniture sector accounts for only a small, but growing, proportion of sales, accounting for US\$100 million of sales in 1998. The fast growth of hi-tech companies and large firms has increased demand for office furniture in recent years – a trend that is expected to continue with the development of these high-growth sectors. While Gaza workers are less likely to be able to meet the higher-end design requirements, the REP would be an attractive location of mid-priced furniture, where rising labor wages in Israel would hit their competitiveness the hardest. In addition, the REP can provide Israeli producers with access to the large and growing Arab market. For example, the Saudi furniture market is valued at more than US\$600 million (1999) – with office furniture accounting for US\$210 million) and is largely dependent on imports (which account for 90 percent of office furniture imports), a market from which Israeli producers have been excluded.
- **Limited Potential from Other Sources.** Given the bulky nature of furniture, producers generally prefer to locate close to end-user markets for lower-value products. Imports to Israel from European and American manufacturers are largely high-end products. There are very few foreign producers established in Israel operating in such categories, indicating the Israeli market is not large enough to attract foreign producers – the REP is not likely to prove any more attractive.

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*Warehousing and Logistics* Investment in the warehousing and logistics sector is driven by three key factors: high-quality, low-cost transportation infrastructure, the strategic value of a given geographic location, and local demand for services.

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**Transportation.** The REP will be located adjacent to the Gaza International Airport (GIA). While the new airport has cargo facilities available, they have not yet been operationalized due to the absence of an agreement with Israeli Customs and the lack of adequate equipment. Once operationalized, the new airport cargo facilities can prove to be a positive asset to REP-based warehousing and logistics facilities. The proposed Gaza Seaport, to be located approximately 30 kilometers from the REP, will be another important asset in the long-run. However, in the present term, Gaza-based industries are dependent on Israeli transportation facilities (Ashdod Port and Ben Gurion Airport) for their transportation needs. While these facilities provide generally high quality infrastructure, the cost of using these facilities is quite high for Gaza-based producers due to extra security fees and costs associated with resulting delays. These factors can reduce, in the short-run, the attractiveness of the REP as an investment location.

**Geographic Location.** The REP is strategically located in close proximity to three markets: Gaza, Israel and Egypt – all of which can be serviced by ground transportation, opening the opportunity for services to the larger region.

**Local Demand Potential.** However, given the current difficulties associated with the movement of goods by land, it is expected that any logistics and warehousing operations in the REP will be driven by local, rather than regional, demand. Local demand can be expected to come from a variety of sources:

- *Logistics Handling and Warehousing for REP-based Manufacturers.* REP-based manufacturers will likely import a significant share of inputs and export finished goods through Israeli ports. In the early stages of the REP's development, much of the required warehousing and logistics for these companies will be conducted in-house (or, for Israeli manufacturers, their existing facilities in Israel). Over time, as operations grow, REP-based enterprises will have growing demand for on-site logistics services and shared warehousing facilities. The diversification of activities will increase the viability of airfreight services through GIA, further enhancing

the REP's attractiveness for investment in logistics and warehousing.

- *Logistics Handling for Other Gaza-based Industries.* Another potential source of demand for REP-based logistics and warehousing services is from southern Gaza's most prominent industry sector: agriculture. Like all of WBG, Gaza's largest exports are agricultural products, including cut flowers, citrus and tomatoes. Currently all agricultural products exported abroad from Gaza go through specialized Israeli consortiums and/or logistics handlers, such as Agrexco and the Citrus Marketing Board. While ground transportation procedures through the Karni crossing have been somewhat streamlined, Gazan agricultural goods are often damaged while border closures can translate into lost market opportunities. While Israeli export channels are likely to dominate in the short-term, Gaza-based agriculture producers should be encouraged to shift to direct exports through GIA. As direct exports grow, so will the demand for cold storage and logistics handling.
- *Warehousing and Distribution of Inbound Consumer Goods.* The REP is likely to be an attractive destination for warehousing and distribution facilities – including break bulk, repackaging, and storage services - for imported consumer and other products for the local market. While these facilities are likely to be relatively small, given the size of the local market, existing investment and interest for warehousing facilities in the GIE indicate that such investments would be likely candidates for the REP as well.

Local demand is expected to be sufficient to attract warehousing and logistics-related investments. In the short-term, given the above sources of demand, the level of activity is expected to be relatively low and will likely only attract local Palestinian investment. Over time, however, as REP-based enterprises expand and the GIA gradually becomes an option for direct exports (particularly for local agricultural production), the REP will become a more attractive location for investment by Israel-based and other service providers.

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*Information Technology*

The REP is not likely to be an attractive location for investment in the information technology sector in the short-term due to the limited supply of qualified IT workers in Gaza and competition from the KITE for Israel-based investors.

Table 4.6 below demonstrates the REP's lack of comparative advantage for IT-related industries, such as software development.

**Table 4.6: Factor Requirements for Software Development**

Factor	Requirements	Conditions in REP	Outcome
Labor Availability	Pool of qualified programmers with language certification	Very small supply of computer graduates, few with industry certification. Only six software companies operating in Gaza.	Negative
Labor Costs	Not as important as skills	Relatively cost-competitive vis-à-vis other Middle East locations	Neutral
Technical Support Services	Requires qualified technicians for repair and maintenance of hardware	Relative supply of trained technicians, plus access to Israeli support services	Positive
Market Access	Requires access to large market	Local market demand is relatively small and Rep is located relatively far from existing tech center in Israel (must compete with KITE)	Negative
Electricity	Reliable, relatively low-cost power supply required	Possible to provide reliable power supply but at relatively high cost	Neutral
Water	Not very important	-----	Neutral
Telecommunications	Need for low-cost, high-quality telecoms, including high-speed access	Inadequate telecoms infrastructure and expensive high-speed access	Negative
Transportation	Not very important	-----	Neutral
Land & Buildings	Desirable to have high-quality office space	EDC will provide high-quality office space	Positive
<b>OVERALL</b>			<b>Negative</b>

The IT industry is very much in its infancy in Gaza. There are currently only six or seven software development companies, each with only a couple of employees and most producing

software that is not saleable in more sophisticated markets. Local demand by industry is also very much in its infancy, with only a limited number of large-scale companies to drive demand for more sophisticated, locally-produced products. There are currently only about 125 university students in Gaza enrolled in computer science programs – not enough to spawn, in the short-term at least, an new IT industry in Gaza.

The REP is located in relatively close proximity to large and booming IT sector in Israel, which can provide opportunities for outsourced programming, the REP could, in a more limited way, mirror the role of the KITE. The KITE is designed to attract IT-related investment from the adjacent the Tel Aviv-Haifa hi-tech corridor and will be outfitted with appropriate telecoms infrastructure as well as an on-site training center geared toward IT skills development. The KITE also has a larger pool of experienced programmers to draw from, which will prove to be one of its key attractions. While, in theory, the REP could be equipped with similar infrastructure, the expected level of investment would not warrant such an outlay in the short-term.

While investment is not likely in the short-term, in the medium-term, however, as demand for IT services by REP-based and other Gaza-based enterprises grows, the REP is more likely to attract some investment by small local (or Egyptian) software companies interested in servicing a small but growing market.

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#### *Other Potential Sectors*

Several other sectors were identified as potential targets for investment into the REP. Given the prominence of Israeli sources in the target industries for the REP, these industries were selected based on an analysis of other traditional sectors in the Israeli economy, some of which already figure strongly in Gaza's industrial sector. The selected sectors are summarized below.

- **Footwear and Other Leather Goods.** Footwear and leather goods (luggage, other bags) are potential sectors for investment into the REP by both Israeli and Palestinian investors. In Israel, this sector comprises more than 250 companies (this estimate includes only those establishments with more than 5 employees) and US\$230 million in sales,

more than 80 percent of which is consumed on the local market. The local Gaza leather sector is relatively small, comprising only 60 establishments and 270 workers. The majority of output is of relatively low quality and competes with cheap imports of synthetic fiber products from China. The REP, by attracting new investments from Israel, could provide a favorable environment for the development of a more export-oriented leather industry in Gaza, with improved design and quality.

- **Paper Packaging Products.** The paper packaging sector, like many other sectors in Gaza, is underdeveloped in terms of export-quality output. There were only 2 companies in 1998, with most output oriented toward basic paperboard boxes for products to be sold on the local market. However, the development of other export-oriented industries in the REP will drive the demand for packaging that meets export requirements in terms of quality and design. Israel, on the other hand, has a large paper packaging sector that, along with other packaging sectors, is strongly supported by the Institute for Advancement of Packaging & Design, which supports the development of high-quality designs, geared toward export markets. The REP can provide a favorable environment for the relocation and/or expansion of Israeli production facilities, providing opportunities for the transfer of production and design know-how to the local Palestinian sector.
- **Toys and Games.** Israel has a relatively strong niche industry in toys and games. Niche products include: wheeled toys, model assembly kits, construction sets, animal figurines, toy musical instruments, puzzles, and a multitude of other categories. In 1998, exports totaled US\$28 million. Like other traditional sectors in Israel, assembly operations in this sector are coming under increasing competitive pressures, indicating the potential to move such activities “offshore” as their Israeli operations concentrate on design and marketing activities. While Gaza hosts only a few companies operating in this sector, local experience in other related sectors, such as plastic molding, metalwork, and simple assembly would be easily transferable to the toy sector. The REP can provide a

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favorable environment for the relocation and/or expansion of Israeli production facilities, providing opportunities for the transfer of production know-how and development of export-quality products to the local Palestinian sector.

## Summary of Target Industries and Sources of Investment

The following table provides a summary of the target sectors and sources of investment for the REP.

Table 4.7: Summary of Target Industries and Sources of Investment

Industry	Niche Activities	Primary Sources	Secondary Sources
Food Processing	<ul style="list-style-type: none"> <li>Processing of local &amp; Israeli produce and dairy products for Israeli (and local) consumption</li> <li>Processing of local agriculture for export to regional and world markets</li> </ul>	Israel	Gaza & Expats
Electronics & Electrical Appliances	Consumer electronics and white goods: <ul style="list-style-type: none"> <li>"Offshore" production from Israel</li> <li>Regional "point-of-sale" operations</li> </ul>	Israel-based including MNCs	Expats & Gaza
Textiles	<ul style="list-style-type: none"> <li>Textiles (woven and knitted fabrics) for local and Israeli apparel sectors</li> </ul>	Israel	Gaza & Expats
Apparel	<ul style="list-style-type: none"> <li>High value-added apparel for export to U.S. and EU</li> </ul>	Israel	Gaza & Expats
Rubber & Plastics	Lower value products, including: <ul style="list-style-type: none"> <li>spare automotive and machinery parts,</li> <li>household goods,</li> <li>packaging materials, and</li> <li>building and construction materials.</li> </ul>	Israel	Gaza & Expats
Paper Packaging	<ul style="list-style-type: none"> <li>Paper packaging materials including paperboard boxes</li> </ul>	Israel	Gaza & Expats
Furniture	<ul style="list-style-type: none"> <li>Office furniture (metal, plastic, and wood)</li> </ul>	Israel	Gaza
Other Potential Sectors	<ul style="list-style-type: none"> <li>Paper packaging</li> <li>Toys and Games</li> <li>Footwear and other leather goods</li> </ul>	Israel, Gaza	
Logistics & Warehousing	<ul style="list-style-type: none"> <li>Outbound logistics for finished products for export from REP-based enterprises</li> <li>Warehousing and distribution for inbound consumer and other goods for local market</li> </ul>	Gaza	Israel & Expats



#### 4.4 Overview of Demand Surveys

Based on the results of the market analysis, outlined above, a series of demand surveys were carried out in the identified target industries and markets. A list of all the companies surveyed is contained in Annex A to this report.

The purpose of these surveys was three-fold:

- To validate the interest of potential investors in investing in the strategically targeted industries and markets, identified in the previous section.
- To identify the necessary conditions—economic, political, and regulatory— for investment in the REP.
- To estimate the number of expected investments in the REP.

The following subsections provide an overview of the surveys and the key factors - identified by the surveyed investors - that will impact the investment decisions of potential investors. The estimation of the expected number of investments to the REP, based on the survey results, and the methodology used to do this, will be presented in section 4.5 below.

##### Overview of Surveys

Approximately 200 hundred surveys were carried with potential investors in Israel, Gaza, Egypt, and the Palestinian Diaspora. The interviewees were, typically, the Managing Directors/Owners, *i.e.* those with the power to make investment decisions on behalf of the selected companies.

- 106 surveys were carried out in **Israel**, including surveys with Israel-based multinationals, in the following sectors: food processing, textiles, apparel, footwear and leather goods, furniture, rubber and plastics, paper packaging, toys and games, electronics and electrical appliances, and information technology.
- 18 surveys were carried out in the **Gaza Strip** in the following sectors: textiles, apparel, furniture, rubber and plastics,

electronics and electrical appliances, warehousing and distribution, and information technology.

- 51 surveys were carried out with **Diaspora Palestinians** in key Diaspora population centers in North America (9), South America (3), Europe (10), and the Middle East (29). Sectors included food processing, textiles, apparel, rubber and plastics, electronics and electrical appliances, and information technology.
- 18 surveys were carried out in **Egypt**. In addition to the results of the market analysis, trade data was used to identify industry sectors that could be attracted by WBG's preferential market access to Israel, the US, and the EU. The surveys included the following sectors: food processing, textiles, apparel, furniture electronics and electrical appliances, information technology, and logistics and warehousing.

The breakdown of surveys by industry sectors is as follows:

**Table 4.9: Breakdown of Surveys by Sector**

Sector	Surveys
Food Processing	27
Textiles and Apparel	26
Rubber and Plastic Products	25
Paper Packaging	11
Electronics and Electrical Appliances	21
Furniture	19
Logistics and Warehousing	8
Information Technology	9
Other Sectors	42

### Survey Results

At the end of each of the surveys, interviewees were requested to rank their interest (low/none, moderate, strong, very strong) in the REP. The following provides the results in each market.

- **Israel Survey Results.** Investor response to the REP in the Israeli market was relatively positive, with more than 30

percent of the investors expressing some degree of interest in the REP: 4 investors expressed very strong interest, 12 expressed strong interest, and 21 expressed a moderate level of interest. In terms of sectors, the surveys suggest that the REP will be an attractive location for Israel-based companies in the following industries:

- *Food Processing.* Companies with interest in the REP included producers of confectionaries, packaging of teas, processed garlic, fructose, and corn syrup. Target markets for these investors are primarily local (Israel and WBG) and regional Arab markets.
- *Furniture.* Companies with interest included producers of mid-priced office furniture, playground furniture, and ready-to-assemble furniture, which covered the full range of materials (wood, metal, plastic). Target markets for these

**Table 4.10: Israel Survey Results**

Sector	Level of Interest in REP				Number of Surveys
	Very Strong	Strong	Moderate	Low	
Food Processing	0	2	4	6	12
Textiles	0	0	1	2	3
Apparel	1	1	0	9	11
Rubber and Plastics	0	2	3	11	16
Paper Packaging	0	2	0	9	11
Furniture	0	1	4	10	15
Footwear and Leather Goods	0	0	0	2	2
Electronics & Electrical Appliances	0	0	2	5	7
Logistics & Warehousing	0	0	1	0	1
Other	3	4	6	15	28
<b>TOTAL</b>	<b>4</b>	<b>12</b>	<b>21</b>	<b>69</b>	<b>106</b>

investors are primarily local (Israel and WBG) and regional Arab markets.

- *Rubber and Plastics.* Companies with interest in the REP included producers of flexible and non-flexible packaging, spare automotive and machinery parts, and conveyor belts. Target markets for these investors are primarily local (Israel and WBG) and regional Arab markets, though one company (conveyor belts and spare parts) indicated an interest in exporting to the US and EU, markets that the company presently serves through its Israeli operations.
  - *Apparel.* Companies with interest in the REP included manufacturers of knitted fashion sportswear and children's knitwear. Target markets are their existing markets in the US and EU, as well as new Arab regional markets.
  - *Paper Packaging.* Companies with interest in the REP included producers of printed cartons for the food processing industry, other printed cartons, and flexible packaging. Target markets for these investors are primarily local (Israel and WBG) and regional Arab markets, though one company (printed cartons) indicated an interest in exporting to the US and EU, markets that the company presently serves through its Israeli operations.
  - *Other Manufacturing.* Companies with interest in the REP included producers of toys and games (educational games, playing cards), bath and skincare products, decorative candle, and fiberglass products. Target markets for these investors are primarily local (Israel and WBG) and regional Arab markets, as well as their existing markets in the US and EU (toys and games, bath and skincare products).
- **Gaza Survey Results.** Investor response to the REP in the Gaza market was modest, with only 4 out of the 18 companies expressing a moderate level of interest. In terms of sectors, the surveys suggest that the REP will be an attractive location for Gaza-based companies in the following industries:

- *Furniture.* Companies with interest in the REP included producers of home and office furniture (wood-based). Target markets for these investors are primarily local (Israel and WBG) and regional Arab markets.
- *Rubber and Plastics.* One company with interest in the REP included a producer of Styrofoam and molded and blown plastic articles. This company, and others like it that were surveyed, are largely oriented toward the local WBG market and are interested in expanding to other regional markets, including Israel.

Table 4.11: Gaza Survey Results

Sector	Level of Interest in REP				Number of Surveys
	Very Strong	Strong	Moderate	Low	
Textiles	0	0	0	1	1
Apparel	0	0	0	1	1
Rubber and Plastics	0	0	1	1	2
Furniture	0	0	3	0	3
Electronics & Electrical Appliances	0	0	0	6	6
Logistics & Warehousing	0	0	0	2	2
Other	0	0	0	3	3
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>14</b>	<b>18</b>

- **Diaspora Palestinian Survey Results.** Investor response to the REP in the Diaspora Palestinian market was very modest (see discussion in the following section), with only 4 out of the 51 companies expressing any interest (though several others had some interest in other locations in Gaza). Companies with interest in the REP were operating in the following sectors:
  - *Rubber and Plastics.* One company with interest in the REP, based in Egypt, included a producer of plastic construction materials, such as irrigation pipes.

- *Electronics and Electrical Appliances.* Two companies indicated a moderate to very strong interest in the REP. One company is interested in setting up a computer assembly operation to supply the local market. The other company is interested in setting up a facility for the assembly of mobile phones, also for the local market.

**Table 4.12: Palestinian Diaspora Survey Results**

Sector	Level of Interest in REP				Number of Surveys
	Very Strong	Strong	Moderate	Low	
Food Processing	0	0	0	11	11
Textiles	0	0	0	3	3
Apparel	0	0	0	4	4
Rubber and Plastics	0	0	1	6	7
Electronics & Electrical Appliances	1	0	2	7	10
Logistics & Warehousing	0	0	0	4	4
Other	0	0	1	11	12
<b>TOTAL</b>	<b>1</b>	<b>0</b>	<b>4</b>	<b>45</b>	<b>51</b>

- **Egypt Survey Results.** Investor response to the REP in the Egypt market was modest, with only 4 out of the 18 companies expressing a moderate level of interest. Companies with interest in the REP were operating in the following sectors:
  - *Food Processing.* Two companies expressed interest in the REP. One company produces dairy products that it already exports to Gaza, which would be the main market for any new investment in the REP. The other company produces confectionary items (candy, biscuits), but has more interest in processing fruit and vegetable products in the REP for sale on the local, Israeli and Arab region markets.

Table 4.13: Egypt Survey Results

Sector	Level of Interest in REP				Number of Surveys
	Very Strong	Strong	Moderate	Low	
Food Processing	0	0	2	2	4
Textiles	0	0	0	1	1
Apparel	0	0	0	2	2
Furniture	0	0	0	1	1
Electronics & Electrical Appliances	0	0	1	2	3
Logistics & Warehousing	0	0	0	1	1
Other	0	0	1	5	6
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>14</b>	<b>18</b>

- *Electronics and Electrical Appliances.* Two companies expressed interest in the REP. One company expressed interest in establishing a computer assembly operation in the REP to serve local, regional, and African markets. Another company, producing a range of consumer electronic and electrical appliance products, expressed interest in Rafah to serve local, regional and African markets.
- *Information Technology.* While current interest by IT companies was low, many indicated that, as the REP develops, they may be interested in locating there if enough local demand exists for customized and turnkey services.

#### Key Factors Impacting Demand

The following provides a brief overview of the key factors that are likely to impact investment in the REP, based on the results of the surveys.

- **Israel-based Investors.** The overall positive response by Israel-based investors to investment in the REP is largely driven by three key factors: the availability of relatively low-

cost, skilled labor, the increased security that would be provided by the REP, and, to some extent, proximity to the airport and seaport, as well as access to Arab markets. Many investors also cited their belief that increased economic cooperation between Israelis and Palestinians is required and indicated their desire to assist in this process. These attributes were important to investors across the full range of industry sectors. While most investors were generally favorable about investment in WBG, a number of issues were cited that are likely to deter investment in the REP.

- Despite the proximity of the REP to Israel, many Israeli investors consider Rafah to be too remote from their existing facilities. Unlike an investment in a country further away, these investors expect to manage their WBG-based facility from their existing facilities in Israel and, therefore, “distance” plays an important role in their decision-making.
  - Uncertainty about the Peace Process and security-related issues (both physical and financial) can deter investment. Any promotional campaign would need to strongly emphasize the laws and regulations that shape the REP investment environment and how the REP can actually resolve many of their concerns regarding security.
  - A number of investors expressed concerns about their ability to recruit qualified engineers and other technical labor in Gaza. The relative shortage of such workers in Gaza can deter investment in areas that are strongly dependent on particular skill categories.
- **Gaza-based Investors.** The key factors impacting interest by local investors in the REP include the following: A number of companies indicated that they currently have little interest in relocating or expanding their existing operations due to overcapacity, a problem evident across a wide range of industry sectors. The small size of the local market and depressed sales due to the unfavorable macroeconomic environment in Gaza has led many companies to cut back employment and production. Few, outside the apparel sector, have the experience or necessary capacity to access external



markets, though many indicated that the REP may actually play a positive role in assisting them to reach other markets, by facilitating the movement of goods and people. In addition, many indicated that the REP, by providing ready and reliable infrastructure (particularly water and power, shortages of which make operations in their current locations difficult), would be among the most favorable attributes that the REP could provide. Many are concerned, however, about the cost of locating in the REP.

However, based on the existing cost structure at the GIE, many indicated that an industrial estate environment, even with the many benefits that it would offer in terms of market access and ready and reliable infrastructure, would be unaffordable to them. These investors expressed greater interest in the municipal estate that has been proposed near Gaza City, which they expect to be more affordable.

- **Diaspora Investors.** By and large, Palestinian Diaspora investors expressed a strong desire to assist in the development of the WBG economy. In general, Diaspora interest in investing in WBG exists (close to half expressed at least some interest), though only a small proportion of these investors expressed interest specifically in the REP. Palestinian expatriates in South America (Chile) expressed the lowest degree of interest, given the fact that their families have been there for several generations and few have any knowledge about WBG. Diaspora Palestinians in all the other markets, particularly those located in other Middle East countries, displayed more interest in – and expressed feelings of “connection” with – WBG.

Despite the degree of interest in investing in WBG, Diaspora Palestinians expressed a number of concerns, all of which were common across the various industry sectors. The key factors that have deterred, and will continue to deter, investment in the REP or other locations in WBG are the following: Most investors were concerned about the apparent lack of political stability and uncertainty about the peace process. Many are aware of the difficult operating environment and some have witnessed first-hand the difficulties associated

with the movement of people and goods into and out of the WBG. As the peace process progresses, and some of these issues are resolved, and WBG is perceived as more stable environment, one can expect investor interest to grow. However, many are concerned about the many stories they have heard about corruption in WBG – an issue that needs to be addressed if these investors are to be encouraged to invest in the REP.

- **Egypt-based Investors.** Interest by Egypt-based investors was relatively low due a number of factors that impact interest in most industry sectors more or less equally. The Egyptian private sector, in general, is not at a point where they have the capacity to invest abroad. While the few investors that did express interest in setting operations to service the Gaza market, for most the market size of WBG is too small to warrant the establishment of new facilities in Gaza. Few expressed interest in taking advantage of WBG's preferential market access agreements to Israel, the US and EU. In addition, the REP must compete with Egyptian industrial estates that provide more favorable incentives, particularly concessionary lease rates.

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#### **4.5 Analysis of Survey Results: Implications for REP Development**

The following section presents the demand projections for the REP, based on the results of the market surveys. Separate demand projections are made for the Enterprise Development Center and the Industrial Park. First, however, an overview of the methodology that was used to extrapolate projected demand from the demand surveys is presented.

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##### *Methodology: Interpreting REP Survey Results*

The model used to extrapolate projected demand from the demand surveys is a 7-step process.

**Step 1: Identifying Demand for REP vs. Alternative Locations in WBG.** Many of the interviewees indicating positive responses to the REP indicated an equal level of interest in other industrial estates in WBG, including Tarqumiya, Jenin, and Nablus. It was

assumed, therefore, that one-half of these investors would actually choose the REP as an investment location.

**Step 2: Identifying Potential EDC vs. IP Demand.** The second step of the demand projection process was to analyze the results of the demand surveys, presented above, in order to determine what proportion of those prospective investments would be appropriate for entry into the Enterprise Development Center. If the EDC is to succeed in its goals – to stimulate the expansion into new, higher value-added product areas, to encourage the introduction of new production know-how, and ultimately to promote the production of export-quality goods – entry into the EDC will have to be carefully screened in order to identify those investments that can meet these goals. Based on information provided in the surveys, the results of the surveys, presented above, were assigned to the EDC or the Industrial Park. From the information provided, one-fourth of the activities identified by prospective investors were deemed to meet the above criteria for investment into the EDC. A more detailed description of these activities is presented with EDC demand projections below.

For example, in the Rubber and Plastics Sector, two out of the five companies that indicated an interest in the REP were deemed to be appropriate targets for the EDC; two companies producing export-quality flexible and non-flexible packaging products. Therefore, two-fifths of the expected investment in the Rubber and Plastics sector was “assigned” to the REP.

**Step 3: Estimating the Expansion Coefficients.** In order to extrapolate projected demand from the surveys, it was also necessary to analyze the industry structures in each of the target markets. The goal was to estimate the size of the pool of targeted demand, in each industry sector. This was done by targeting only those companies that have more than 20 employees (and are therefore large enough to consider an REP investment),<sup>4</sup> and those with activities that are deemed appropriate for location at the REP, given its existing factor endowments.

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<sup>4</sup> This criteria was relaxed for companies operating in the service sector, where employment tends to be lower.

For example, while the rubber and plastics sector is a promising industry for development at the REP, not all rubber and plastics companies would be prospective targets as many of them would be conducting activities that would be outside the scope of what is possible in the REP context, given its existing factor endowments. Only those activities that meet the REP's factor endowments were considered as potential targets. In the case of the rubber and plastics sector, there are approximately 100 companies in Israel that have above 20 employees. Of these companies, it is estimated that two-thirds of these companies are likely operating in activities that would be appropriate for investment into the REP. The remainder are manufacturing products that are outside the scope of the REP's factor endowments, such as specialized plastics for the defense and aerospace industries.

**Step 4. Estimating Number of Interested Companies in Target Pool.** These estimates were then used to calculate expansion coefficients for each industry sector that were used to extrapolate the survey results to the wider pool of potential investors, *i.e.* if 5 out of 16 of the companies surveyed in the rubber and plastics sector in Israel expressed some level of interest in the REP, how many other companies would display a similar level of interest? In the case of the rubber and plastics sector in the Israeli market, it estimated that for each positive survey result, there are another 3.8 companies that are likely to display a similar level of interest.

In the case of the estimating expansion coefficients for Egypt and Diaspora Palestinians, a slightly different methodology was adopted due to the lack of adequate information on the total pool of potential investors. Instead, expansion coefficients were based on best estimates. The demand projections also take into consideration potential investment from other sources. The Israel surveys included several companies that are American or European MNCs. Similarly, a best estimate expansion coefficient was used to establish the total pool of US- and EU-based MNCs with potential interest in the REP.

**Table 4.14: Sample Calculation of Expansion Coefficients (IP-Targeted Investments in Rubber and Plastics Sector in Israel)<sup>5</sup>**

A	Number of Surveyed Companies with “Very Strong” Interest	0
B	Number of Surveyed Companies with “Strong” Interest	.5
C	Number of Surveyed Companies with “Moderate” Interest	1
D	Proportion of Surveys with Positive Results (EDC + IP Investments)	5/16
E	Number of Companies with More than 20 Employees	93
F	Proportion Operating in Target Activities	2/3
G	Total Pool of Target Companies (E x F)	61
H	Expansion Coefficient (D x G)	3.8
I	Estimated Number of Target Companies with “Very Strong” Interest (A x H)	0
J	Estimated Number of Target Companies with “Strong” Interest (B x H)	1.9
K	Estimated Number of Target Companies with “Moderate” Interest (C x H)	3.8

**Step 5: Estimating Actualization Rates.** As discussed above, the interviewees were requested to rank their interest in the REP. For each level of interest, an actualization rate was assigned, to estimate what proportion of those companies that would classify their interest at a given level would actually make an investment in the REP. For those indicating a very strong interest in the REP, it was assumed that 2/3 of them actually make an investment; for those with a strong interest, 1/2; and for those with a moderate level of interest, 1/4. Table 4.15 uses the results of the rubber and

<sup>5</sup> For the purpose of the sample calculation, only potential investments to the Industrial Park component of the REP have been used.

plastics sector in Israel to demonstrate the results (final results are rounded).

**Table 4.15: Sample Calculation of Actualized Investments (Rubber and Plastics Sector in Israel)**

Level of Interest	Estimated No. of Companies with Interest	Actualization Rate	Estimated No. of Actual Investments
Very Strong	0	2/3	0
Strong	2	1/2	1
Moderate	4	1/4	1
<b>Total Expected Number of Investments</b>	<b>6</b>		<b>2</b>

Given the nature of the surveys, which were designed to evaluate *current* interest in the REP, the number of estimated “actual” investments are expected to be realized over the short-term, which the experience of industrial estate developments around the world typically defines as a 3-year time horizon. Therefore, in the case of Rubber and Plastics investments sourced from Israel, it is assumed that the Industrial Park component of the REP will attract 0-1 investments per year during the first three years of operation.

**Step 6: Estimating Employment, Investment and Space Uptake.** In order to determine what this number of investment projects means for the REP in terms of employment generation, the various industry sectors were divided into broad industry categories: Medium-intensity (*i.e.* more capital-intensive), Light-intensity (*i.e.* more labor-intensive), Service industries. The following table demonstrates to which category each sector has been assigned.

**Table 4.16: Division of Sectors into Broad Industry Categories**

Industry Categories	Sectors
Medium-intensity	<ul style="list-style-type: none"> <li>▪ Food Processing</li> <li>▪ Textiles</li> <li>▪ Rubber and Plastics</li> <li>▪ Paper Packaging</li> <li>▪ Electronics and Electrical Appliances</li> <li>▪ Other Industries</li> </ul>
Light-intensity	<ul style="list-style-type: none"> <li>▪ Apparel</li> <li>▪ Footwear and Leather Goods</li> <li>▪ Furniture</li> </ul>
Services	<ul style="list-style-type: none"> <li>▪ Logistics and Warehousing</li> </ul>

Based on these broad industry groupings, estimates were made on the average size of investment, derived from data collected on industrial-estate development worldwide in locations similar to the REP in terms of factor endowments. Separate averages, however, are used for the EDC investments; investments there are expected to be relatively small, given the EDC's unique set of entry criteria that will limit the size of investments. The following table shows the average amount of employment, investment and required space for each of the categories. Actual investments, however, are likely to vary considerably, with some investments larger than these figures, while others may be smaller.

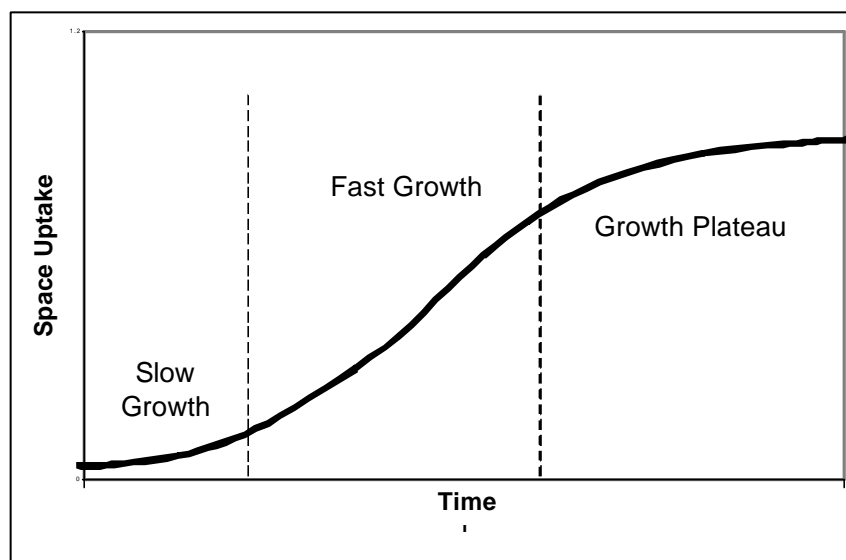
**Table 4.17: Average Investment Size, by Industry Category**

	Average Employment	Average Investment (US\$ '000)	Average Space Requirements (m2 of built-up space)
Medium-Intensity	60	1,200	1,800
Light-Intensity	70	700	1,000
Services	20	150	3,000
EDC	30	450	750

**Step 7: Extrapolating Demand into the Future.** As mentioned above, the demand estimates projected above are designed to fulfill a three-year time horizon. These figures were extrapolated, using estimated growth rates, to project demand into the future, covering a 20-year time horizon. The extrapolations are based on

estimated growth rates, which were derived from the experience of similarly-sized industrial estates in other locations worldwide. Industrial estate growth typically follows an S-shaped pattern, as demonstrated in Figure 4.1 below. Industrial estates typically experience a slow start-up over the first few years of development. Once the industrial estate establishes its presence in a market, demand typically accelerates. After several years of accelerated growth, industrial estates typically reach a period of maturation, during which the pace of demand slows.

**Figure 4.1: Typical Pattern of Industrial Estate Development**



*REP Demand: Moving Up the Value Chain*

The following sections present the demand projections for the REP. In terms of activities, in the initial stages of REP development, investment will be focused on those activities, in the targeted industries, that can take advantage of the REP's current resource endowments – in particular, the REP's pool of skilled and semi-skilled labor. In the initial stages, REP output will be oriented primarily toward local and regional markets. EDC-based enterprises will, however, be engaged in more export-oriented, higher-skilled activities than other REP investors.



However, the composition of investment is likely to change over time. As the EDC-based enterprises reach their goals and as the Gaza human resource base develops, investments will follow suit, with investments focused on increasingly higher skilled and greater value-added activities, mainly within the same sectors. For example, investments in the electronics sector will move from basic assembly operations to pilot manufacturing for the region. Similarly, other sectors will evolve from simple assembly to product design and development activities. In addition, over time, REP-based industries will begin to export more and more beyond the region, with the development of direct links to external markets. Logistics and warehousing activities will grow in tune with REP and greater Gaza demand for both inbound and outbound cargo services. Investments in other service sectors, such as information technology, will be attracted to the REP, on a small-scale, to service REP-based industries.

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*Enterprise Development  
Center Demand Projections*

The following presents the demand projections for the EDC component of the REP.

As discussed above, EDC investments will be required to meet specific entry criteria and will, therefore, encourage the entry of only those that can fulfill one or more of the following:

- the production of export-quality goods;
- the introduction of new technologies or production know-how;
- the production of new, higher valued-added products.

While these criteria can be met in any of the identified target industry sectors, the survey results indicate that, at least in the initial stages of development, the EDC is likely to attract investments that meet these criteria in the following sectors:

- **Rubber and Plastics.** Potential products include flexible and non-flexible packaging for Israeli and REP-based exports (including IT, electronics, and other consumer products).

- **Furniture.** Potential products include mid-priced wood and metal furniture, produced to Western design standards, for the Israeli and regional market.
- **Electronics.** Potential activities include pilot manufacturing of consumer electronics and telecommunications equipment for the local and regional markets.
- **Paper Packaging.** Potential products include flexible and non-flexible packaging for Israeli and REP-based exports (including IT, electronics, and other consumer products).
- **Toys and Games.** Potential products include assembly of toys and games (wheeled toys, plastic-molded and metal model assembly kits, plastic and metal construction sets, plastic and stuffed figurines, puzzles) for Israeli and Israeli-export markets.

The primary source of demand for the EDC, in the initial stages of development, is expected to be Israel-based companies, including US and EU multinationals with operations in Israel (some in joint ventures with Palestinian partners). Other potential sources include non-Israel based MNCs and Diaspora Palestinians. These are the companies that will most likely be able to meet the EDC entry criteria. These latter sources, as well as local investors, are likely to enter the EDC in larger numbers at a later stage.

Table 4.18 below presents the demand projections for the EDC.

**Table 4.18: Average Annual Investments into EDC<sup>6</sup>**

	Years 1-5	Years 6-10	Years 11-15
Projects	4	4	1-2
Employment	118	121	48
Investment (US\$ mil)	1.7	1.8	0.7
Space Uptake (ha)	1.1	1.2	0.5

<sup>6</sup> Conversion from built up space to raw land based on the following ratios: under roof space to serviced land = 1.0; raw to common land = 0.26.

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*Industrial Park  
Demand Projections*

The Industrial Park component of the REP is expected to attract a wider range of industries and activities and from a wider range of sources, encompassing all those identified in the demand assessment process. Potential activities, in the first stage of development, include the following:

- **Food Processing.** Potential products include processed local agricultural products (tomatoes, citrus, herbs, etc.) for local and Israeli market; and confectionary and baked goods for local and regional markets.
- **Textiles and Apparel.** Potential activities include spinning and weaving of textiles for local and Israeli apparel industries; the manufacturing of knitwear and fashion apparel for Israel and for export to US and EU markets.
- **Rubber and Plastics.** Potential products include automotive and machinery spare parts for regional market, household items for local and regional markets, molded plastic products for other local and Israeli industries; flexible and non-flexible packaging (particularly for agriculture products) for local and Israeli products.
- **Paper Packaging.** Potential products include flexible and non-flexible packaging for local and Israeli industries.
- **Furniture.** Potential products include office furniture (wood, plastic, metal) for local, Israeli and regional markets.
- **Electronics and Electrical Appliances.** Potential activities include assembly of consumer electronics and white goods for local, Israeli and regional markets.

Table 4.19 below presents the demand projections for the Industrial Park space.

**Table 4.19: Average Annual Investments into REP Industrial Park<sup>7</sup>**

	Years 1-5	Years 6-10	Years 11-15	Years 16-20
<b>Projects</b>				
<b>Annual Projects</b>	<b>17-18</b>	<b>18</b>	<b>8-9</b>	<b>3</b>
Medium-intensity	9	9	4	1-2
Light-intensity	7-8	8	3-4	1
Logistics & Warehousing	1	1	0-1	0-1
<b>Employment</b>				
<b>Annual Employment</b>	<b>1114</b>	<b>1310</b>	<b>615</b>	<b>293</b>
Medium-intensity	634	768	361	171
Light-intensity	465	527	248	117
Logistics & Warehousing	15	15	6	5
<b>Investment (US\$ mil)</b>				
<b>Annual Investment</b>	<b>17.5</b>	<b>20.8</b>	<b>9.8</b>	<b>4.7</b>
Medium-intensity	12.7	15.4	7.2	3.4
Light-intensity	4.7	5.3	2.5	1.2
Logistics & Warehousing	0.1	0.1	0.1	0.1
<b>Space Uptake (raw hectares)</b>				
<b>Annual Space Uptake</b>	<b>6.8</b>	<b>8.0</b>	<b>3.8</b>	<b>1.8</b>
Medium-intensity	4.5	5.5	2.6	1.2
Light-intensity	1.7	1.9	0.9	0.4
Logistics & Warehousing	0.6	0.6	0.3	0.2

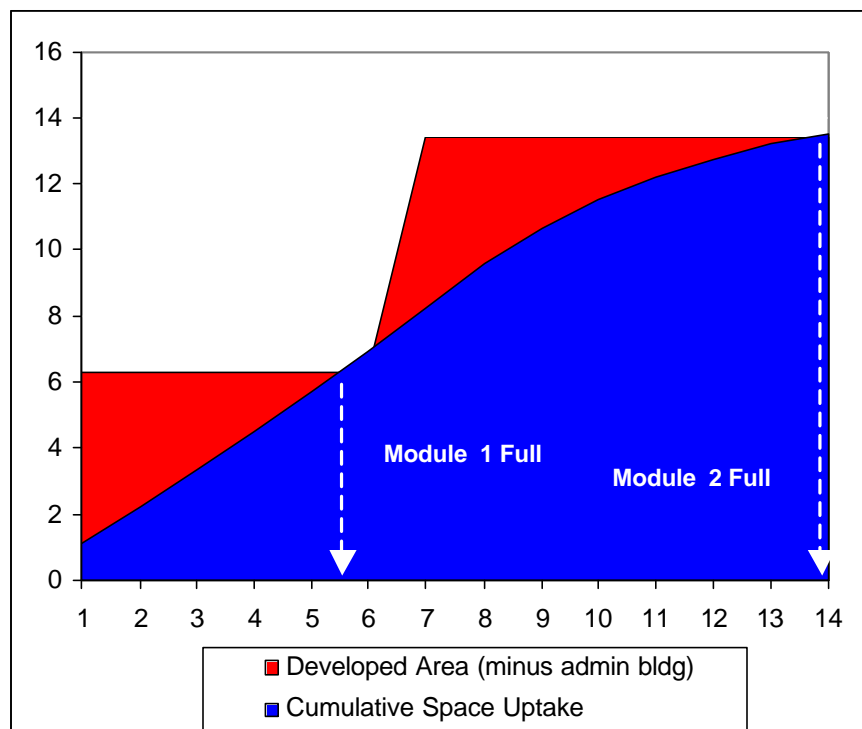
<sup>7</sup> Conversion from built up space to raw land based on the following ratios: under roof space to serviced land = 0.6; raw to common land = 0.3.

### Implications for REP Development

Figures 4.2 and 4.3 below demonstrate the development patterns for the EDC and Industrial Park components of the REP, respectively.

As seen from Figure 4.2, based on the demand projections presented above, the first module of the EDC is expected to fill up by the middle of the sixth year of development. The second module is expected to fill up by the end of year 14.

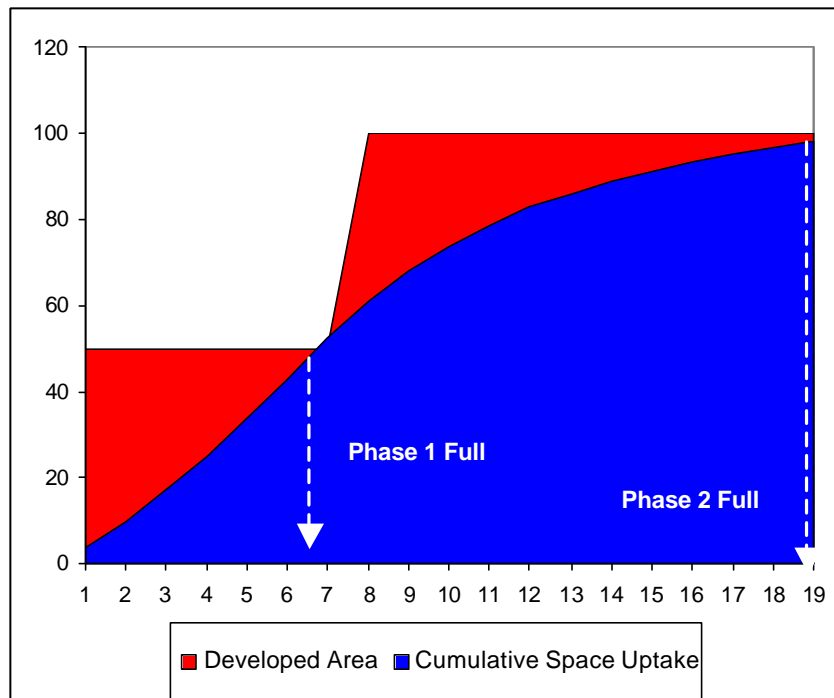
**Figure 4.2: EDC Space Uptake<sup>8</sup>**



<sup>8</sup> These space uptake projections include only space for lease and do not include the space required for the EDC administrative building.

As seen in figure 4.3, based on the demand projections presented above, the first 50-hectare phase of Industrial Park development is expected to fill up by the middle of the seventh year of development. The second 50-hectare phase is expected to fill up by the end of year 19. A detailed discussion of EDC and IP phasing considerations is included in Chapter 6 of this report.

**Figure 4.3: Industrial Park Space Uptake**



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## 5. Site Conditions and Existing Physical Infrastructure

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### 5.1 Introduction

This chapter presents the assessment of existing site conditions and existing infrastructure, which provides input to the Master Planning of the Rafah Enterprise Park. The assessment includes:

- Basic geography and physical characteristics of the site and the surrounding area;
- Utilities infrastructure and services (both existing conditions and expansion opportunities); and
- Transportation network (roads, airport, sea freight, safe passage).

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### 5.2 Site Location, Physical Features, and Demographics

#### *Location*

The proposed site for the Rafah Enterprise Park falls within the Rafah Governorate, which also includes Rafah city and Rafah camp (A 58.5 km<sup>2</sup> area, of which 6,625 dunums are occupied by Israeli settlements and 4,850 dunums are 'under Israeli control'). Rafah Governorate is situated in the southern part of the Gaza Strip<sup>1</sup>, and bounded by Egypt to the South, by the Green Line to the East, by the Mediterranean Sea to the West, and by Khan Younis Governorate to the North (see Figure 5.1).

The proposed site for the Rafah Enterprise Park (REP) is located at the southeastern end of the Gaza Strip, to the east of Rafah city, at the eastern borders with Israel. It is situated about 5 kilometers from the Egyptian borders, 1.5 kilometers from Gaza International Airport, and 8.5 kilometers from the center of Khan Younis. Figure 5.1a shows the proposed location of the REP.

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<sup>1</sup> An area of 365 km<sup>2</sup> populated by about 1 million, is located along the southeastern edge of the Mediterranean Sea coast

Figure 5.1: Proposed Location of Rafah Enterprise Park





**Figure 5.1a: Aerial Photo of Proposed REP Location**

### Population

The 1997 census estimated the total population of the Gaza Strip at 1,001,120 inhabitants, of which 120,246 live in Rafah Governorate. As for the rest of Gaza Strip, it is assumed that the population growth rate for the first five years will remain at its current rate of about 4% (UNSCO, 1999) while it is expected to decline in the following five years to about 3.7%. The projected decline is based on higher costs of living and increased education levels.

**Table 5.1: Distribution of Rafah Governorate Population**

	Urban	Rural	Camps	Total
Population	49,843	11,114	59,289	120,246
% of the Total	41.45%	9.24%	49.31%	100%

The level of urbanization in Rafah Governorate is less than the average for the Gaza Strip, where about 41.45% of the population lives in urban areas, and about 9.24% of the population lives in rural areas, while the rest (49.32%) lives in Refugee camps. Al Shoka falls within the rural areas of Rafah Governorate, with a total population about 8,500.

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Housing

Housing density measures the number of persons living in one housing unit. Housing density largely homogenous throughout the Gaza Strip, with only slight differences between urban and rural locations, and refugee camps. Table 5.2 shows the housing density and number of housing units in Rafah Governorate. At Al Shoka village, there are 892 houses, the majority of which are in bad condition, with poor provision of services such as water and electrical supply.

**Table 5.2: Projected Housing Density and Number of Housing Units in Rafah Governorate (PCBS)**

	1997	2002	2007
Housing Density	7.58	7.58	7.27
Housing Units	15,854	19,301	24,125

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Geology

Most of the Gaza Strip consists of a littoral zone, a strip of younger dunes situated on top of a system of older Pleistocene beach ridges. Inland, the composition changes to gently sloping alluvial and loessial plains. The Gaza Strip is essentially a foreshore sloping eastwards, underlain by a series of geological formations from the Mesozoic to the Quaternary.

Throughout the Gaza Strip, the quaternary deposits are underlain by the Sakiya formation, deposited during Pliocene-Miocene. This formation consists of shallow marine clays, shales and marls, reaching a depth of about 1,200 m at the shoreline and fading out at the eastern boundary of the Strip. The quaternary deposits in the are about 160 m thick and cover the Pliocene Sakiya, which is indicated through a thin layer of conglomerate. Alluvial and wind-brown deposits are found on top of the Pleistocene formation, which locally can reach a thickness of 10 to 25m.

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Tectonics

The regional tectonics framework of the Gaza Strip is part of the low structural plain located at the north-east front of the strongly folded Sinai-Judea Highland. There is no clear evidence of the effect of

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faulting on the surface geology in the Gaza Strip. However, longitudinal faults are suspended in the subsurface. These faults may account for the westward thickening of the Tertiary and the Quaternary formations. To the east of Rafah, a fault with a north-northeast to south-southwest direction is suspected in the Tertiary strata, with about a 50m down throw to the west. Borehole data and geophysical surveys for oil exploration suggest that folds may exist in the Tertiary strata.

*Climate*

The Gaza Strip is located between the arid desert climate of the Sinai and the temperate and semi-humid Mediterranean climate along the coast. It has a Mediterranean dry summer and mild winters. Rafah Governorate is situated in the southern part of the strip. This location makes the climate in Rafah highly affected by the arid desert climate, especially at the proposed Rafah Enterprise Park area, which is located far away from the coast.

*Temperature*

Temperature depends on elevation and distance from the sea. Table 5.3 shows the monthly variations in temperature in Rafah Governorate.

**Table 5.3: Average Monthly Temperature, Humidity, and Rainfall in Rafah**

Month	Temperature (°C)		Humidity	Rainfall (mm)
	Max.	Min.		
January	18	7	49% : 72%	60.04
February	20	8	46% : 67%	49.7
March	22	9	45% : 66%	16.8
April	25	12	43% : 53%	12.3
May	22	14	42% : 57%	2.6
June	31	18	45% : 63%	-
July	32	20	45% : 65%	-
August	32	20	48% : 66%	-
September	30	18	50% : 66%	0.2
October	29	16	50% : 67%	8.8
November	25	13	51% : 69%	51.2
December	20	10	52% : 72%	58

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*Humidity*

Relative humidity is highest near the coast and higher at night in summer than in winter. Humidity reaches its daily minimum around noon and a maximum late at night or during the night. Generally humidity varies in the summer between 65% in the daytime to 85% at night. In winter, it varies between 60% in the daytime to 80% at night.

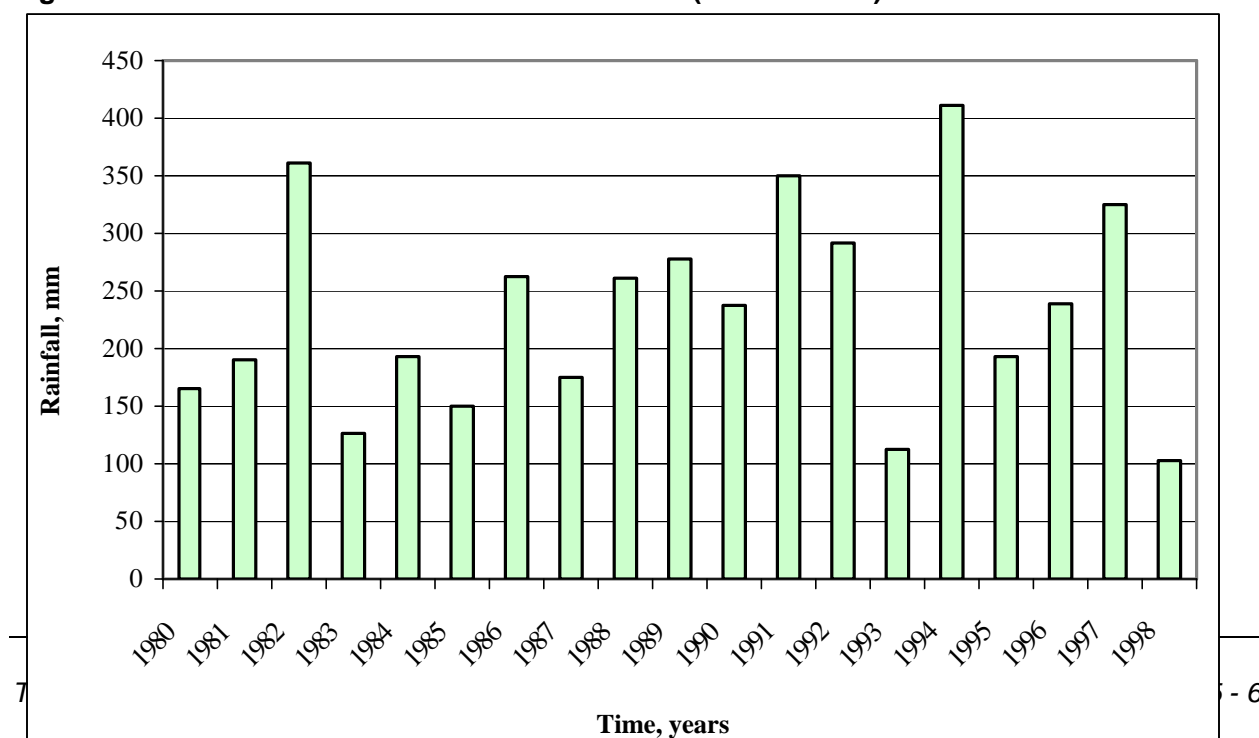
*Wind*

In summer, sea breeze blows all day, changing to land breeze at night. In the summer, the source of prevailing winds is the northwest. There are clear daily fluctuations in the speed of wind during this time. Wind speed reaches its maximum value at noon, (3.9 m/s) and decreases during the night. During the winter, most of the wind blows from the southwest, with an average speed of 4.2 m/s.

*Rainfall*

Figure 5.2 shows the mean annual rainfall at Rafah over the period of 1980-1998. The average for this period is 233 mm.

**Figure 5.2: Annual Rainfall in Rafah Governorate (1980 to 1998)**



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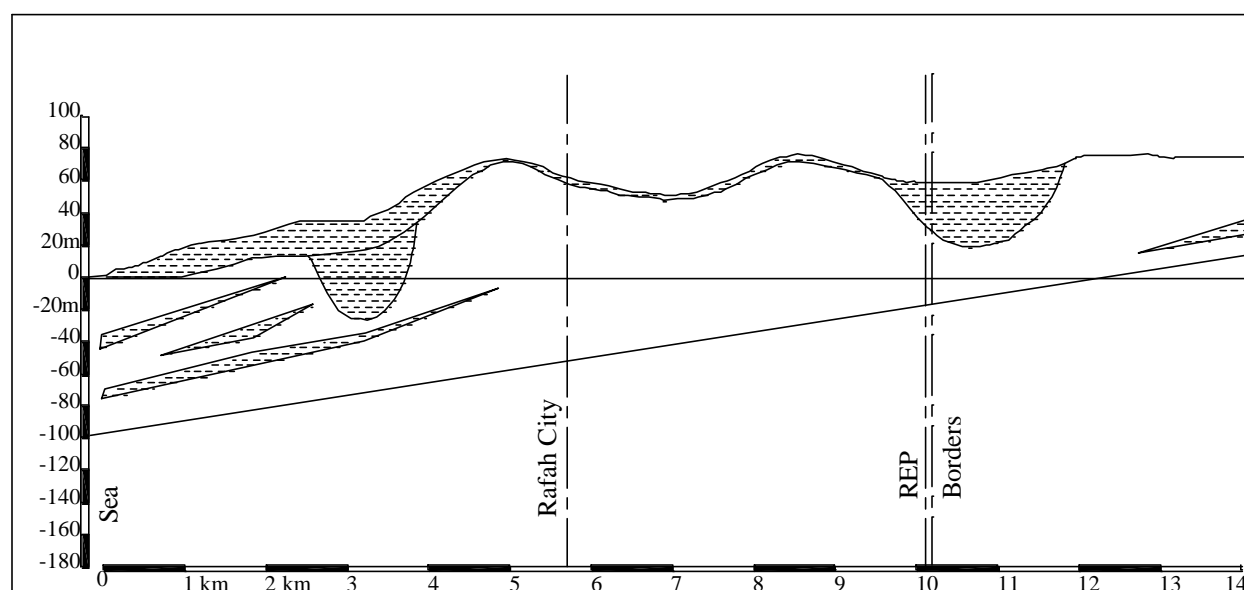
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**Water Resources**

The coastal aquifer is the main source of water in the Gaza Strip, with a long-term sustainable yield about 60mm<sup>3</sup> per year. The groundwater table is located at a depth range from a few meters at the west to about 70-90 meter at the east of the Gaza Strip.

At the proposed REP site, the ground water table is between 68m to 88m below the land surface. Figure 5.3 shows sections in the aquifer in the southern part of the Gaza Strip, which is close to the proposed location of REP. The cross section shows that the thickness of the saturated zone does not exceed a few meters. Therefore, drilling a well in that area is not a viable option from hydrological point of view.

**Figure 5.3: Cross Section of the Aquifer at Rafah Area**



The Gaza Strip faces a severe water quality problem. The water quality of the coastal aquifer underlying Gaza has been deteriorated severely for a number of reasons:

- Overuse of fertilizers and pesticides in agriculture, which is ultimately leached into the ground water.
- Wastewater infiltration to ground water from cesspits and leakage of sewer system, which is responsible for the high nitrate content of the groundwater.
- Seawater intrusion and brine water upcoming as a result of over-abstraction of groundwater, which caused obvious increase in salinity during the past 10 to 15 years.

The eastern part of Rafah Governorate, including the project site, suffers from extremely poor water quality. The average chloride concentration in the ground water at the project area is more than 500 mg/l, and the nitrate concentration is about 250 mg/l - these figures exceed the World Health Organization recommended standards for potable water quality by a significant margin. The eastern part of Rafah (the airport and the surrounding residential communities) depend on wells drilled at the western side of Rafah as their water source.

### 5.3 Topography, Soils, and Drainage

#### *Topography*

The area proposed for industrial development is located at a relatively high elevation for the Gaza Strip, at an average elevation of about 80m above mean sea level. The area is gently sloping towards east, as shown in Figure 5.4.

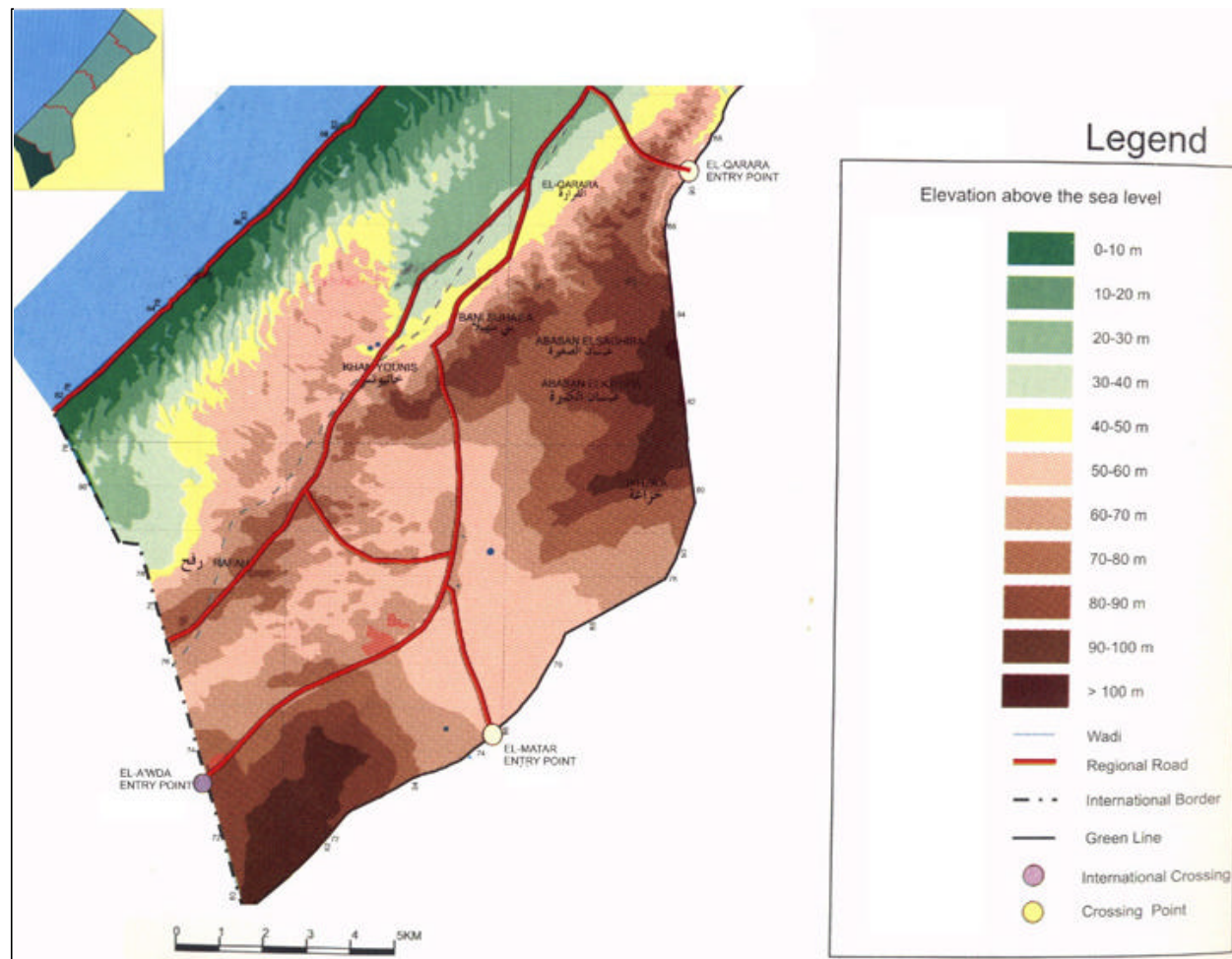
#### *Soils*

Generally, Rafah Governorate soils can be classified as:

- 20% alluvial and gruosolic soils, dominated by laomy clay textures;
- 60% yellow sand and Mawasi soil; and
- 20% loess soil influenced by deposition of eolian dust.

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Figure 5.4: Site Topography





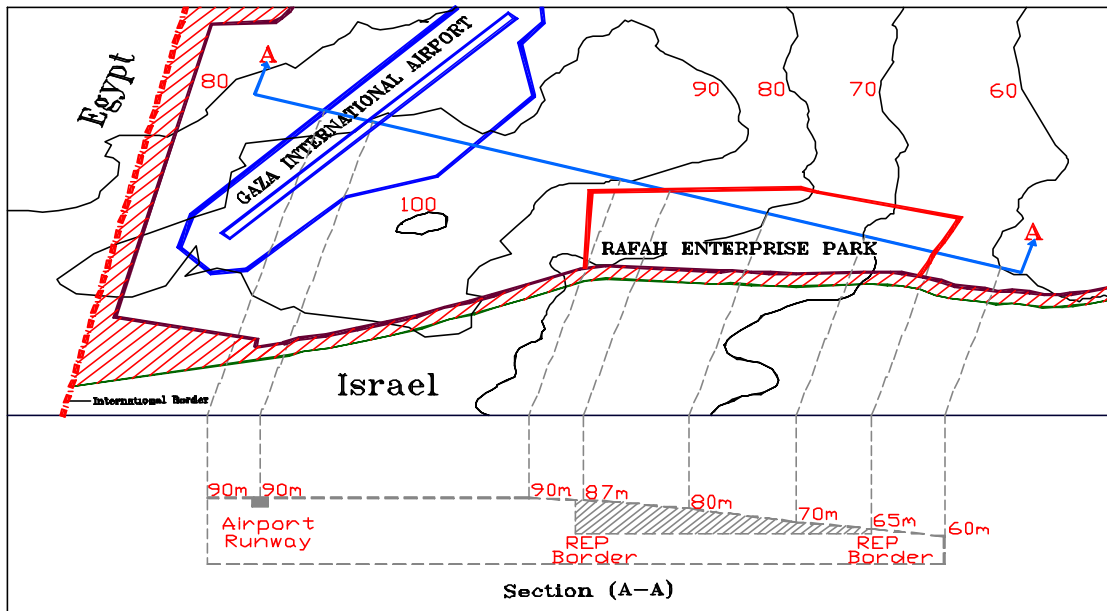
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The proposed REP is located in an area classified as loess soil influenced by deposition of eolian dust, due to its location at the flank of the main deposition zone in the northwestern Negev Desert. Its formation in strata refers to the repeated eolian sedimentation processes in the area.

*Drainage*

As mentioned earlier in the site topography, the area slopes gently towards the east. The contour lines of the area, as shown in Figure 5.5, show that the eastern side of the proposed REP is the lowest part of the area. The area slopes from about 90m above mean sea level in the west to about 65m in the east.

**Figure 5.5: Drainage Contour Lines of REP**



## 5.4 Road Network

The REP is strategically situated close to the Gaza International Airport, the Egyptian border, and the Green Line. In addition, the northern border of the REP site is only about 35km from the proposed site of the Gaza Seaport. Access to Egypt is through the El Awda Crossing (also known as Rafah Crossing), which lies at the extreme south end of Road # 4, which continues inside Egypt past El Awda Crossing leading to Al Arish City and, ultimately, to Cairo.

### *Relation with Existing Major Facilities*

The proposed REP site offers good accessibility to the major transportation facilities in the region. Beit Hanoun (Erez) crossing, the main entry point from Gaza Strip to both Israel and West Bank, is about 40 km away from the proposed location. Sufa Crossing is only 2 km far, and Karni crossing, which serves the Gaza Industrial Estate, is 40 km away from the proposed REP site. Table 5.4 shows the distance between REP and other locations:

**Table 5.4: Distances from Rafah Enterprise Park**

Location	Distance in Km
Sufa Crossing	3
Rafah International Crossing	5
Gaza International Airport	2
Karni Crossing	35
Gaza Industrial Estate	35
Proposed Gaza Seaport	35
Beit Hanoun (Erez) Crossing	40
Ashdod	70
Hebron	90
Ben Gurion Airport	100
Jerusalem	120
Ramallah	140
Nablus	160
Haifa	190
Amman, Jordan	180

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## Regional Roads

Road # 4 (Salah El Din Street) is the main road connecting Rafah to Gaza City. This 30m-wide road passes through Gaza Strip from Beit Hanoun (Erez) crossing in the north to El Awda Crossing at the international border with Egypt. El Rashid Road is another regional road (about 15m wide) that connects Rafah to the north of Gaza Strip, running parallel to the Mediterranean Sea. However, due to the existence of some Israeli settlements to the south of the Deir El-Balah area, most southbound traffic merges off to Road # 4 through Deir El Balah City after passing the Middle Governorate of the Gaza Strip. Figure 5.7 shows the regional roads leading to REP.

**Figure 5.7: Main Regional Roads Leading to REP**



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<i>Main Roads</i>	The main access road to the Gaza International Airport (GIA) branches from Road # 4. This road also extends to the REP site. It is paved and about 12m wide. However, in 1997 the Central Committee of the Ministry of Local Governments approved a plan to widen it up to 24m. Another important road is the Sufa Crossing Road. This road is located to the north of the REP site. It is 12m wide and leads to the Sufa commercial crossing to Israel.
<i>Local Roads</i>	The only paved road that leads to the REP site is the GIA main access road. All other roads on the proposed site are unpaved tracks, used mainly by local farmers. The width of these sandy roads is between 4 and 6 meters. These roads were cleared by mutual agreement of farmers and land beneficiaries.
<i>Safe Passage</i>	Restricted movements are allowed between the Gaza Strip and the West Bank through the Safe Passage. Palestinians may use this route to the West Bank after getting the necessary permits from the Israeli Authorities. The existing passage is called the southern passage and connects the Gaza Strip with Tarqumiya the West Bank. Palestinians may travel using their own cars through this safe passage. However, many of the applicants are not granted permits, and some have to be moved by special convoys guarded by an Israeli patrol. A new northern safe passage to Ramallah is expected to be open in future.
<i>Gaza International Airport</i>	Two kilometers from the REP site lies the Gaza International Airport. The airport became operational in 1998. Although it is not a very busy airport at the moment, it connects Gaza to destinations including Cairo, Amman, Jeddah, Dubai, Abu Dhabi, Casablanca, and Cyprus. Current air traffic is about 2 flights per day. Activities at the airport usually increase in summer.

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<i>Gaza Seaport</i>	Plans to construct a new seaport in Gaza are underway. The proposed site for the seaport is about 35km far from the REP.
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## **5.5 Water Supply and Wastewater Treatment**

<i>Water Supply</i>	<p>Currently, the area of El Shoka does not have a municipal water network. El Shoka residents are being supplied with water from Mekorot (the Israeli water utility company).</p> <p>A 6" pipe (from Mekorot) runs through the El Dehnia area, 2.5 km to the south of the proposed REP site. This pipe is tapped with 7 metered connections; each of them is 2" in diameter. In addition to Gaza International Airport, there are 6 bulk consumers, each with a separate pipeline and distribution system through which the bulk consumer sells water to El Shoka residents. In 1999, the total consumption of the 7 bulk consumers was about 573,500 m<sup>3</sup>/year.</p> <p>Recently, a water well was drilled at the western part of Rafah City, in the El Hashash area, 11km to the northwest of the Airport. A trunk line, 8" in diameter, was installed to connect the well with the Airport (see Figure 5.8). Both the well and the trunk line have been allocated for use by the Airport only. The well pump has a capacity of discharging 76m<sup>3</sup>/hr at 140m head. Based on the hydrological cross-sections of the REP site, there are no known aquifers. Even if any aquifers were to be found in the future, it is very unlikely that these aquifers would have the capacity to discharge sustainable water flow.</p>
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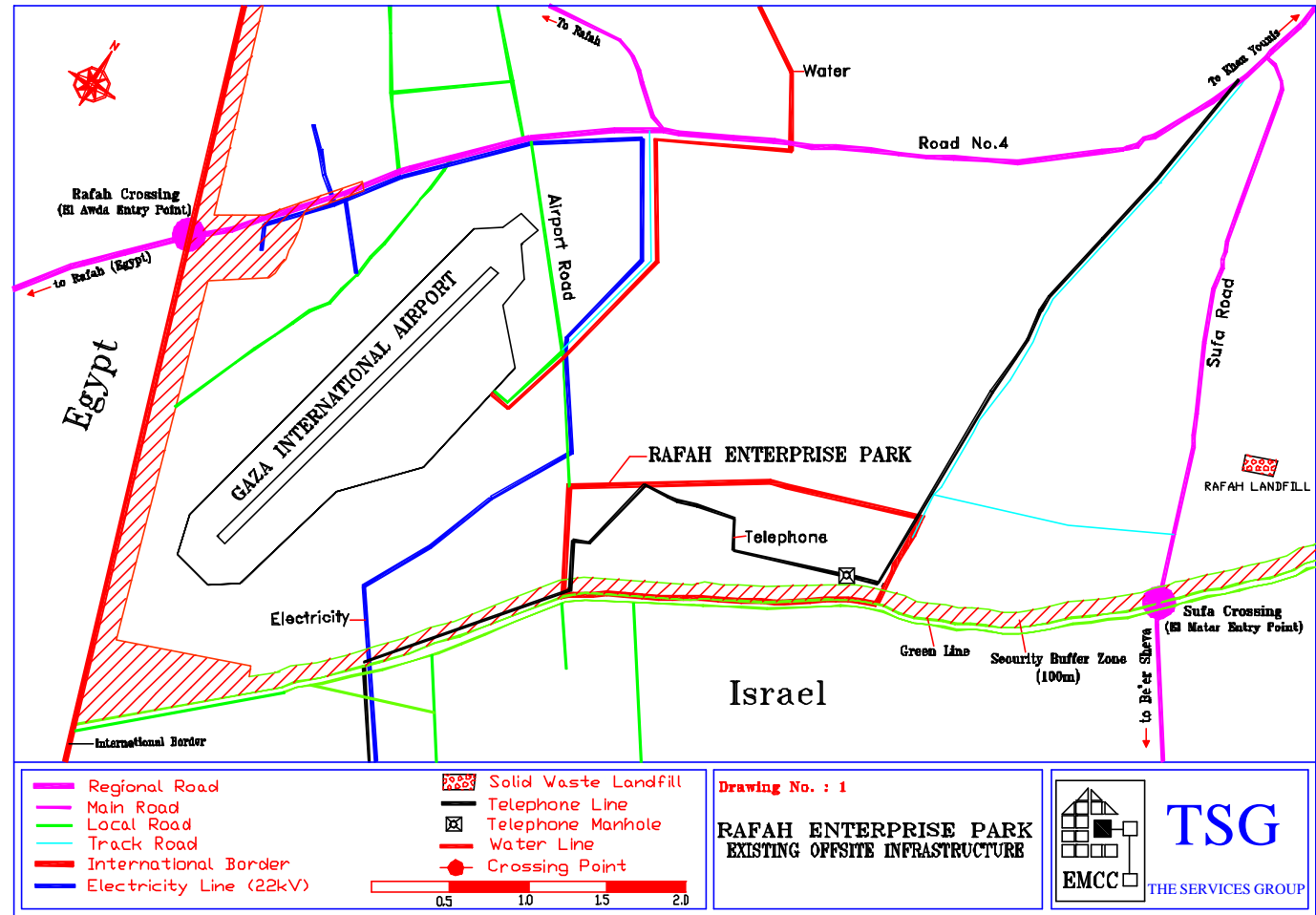
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<i>Waste Water</i>	<p>The El Shoka area, including the REP site for and neighboring areas, is not served with a conventional sewage system. In the city of Rafah, which is the closest urban center to the REP, only 35 percent of the residents are connected to a sanitation system.</p> <p>The sewage collected from Rafah is discharged to a treatment plant at Tel Sultan, 10 km from the REP site. The daily influent to</p>
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Figure 5.8: Existing Offsite Infrastructure



the Rafah Waste Water Treatment Plant (WWTP) is about 5,000 m<sup>3</sup>/day. According to Palestinian Water Authority (PWA), the Rafah WWTP is now overloaded.

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**5.6 Electricity Supply**

The Gaza Strip is currently supplied with electricity from Israel through 11 high-tension lines (22 KVA each). Two of those lines are allocated for use of the Israeli settlements, with the remaining 9 high-tension lines supplying Palestinian residents of Gaza Strip. The maximum permissible load for each of the lines is 11MW. Only one high-tension line feeds the Rafah area, including the Airport. The Palestinian Energy Authority indicated that the existing high-tension line that feeds Rafah is overloaded and does not have the capacity to meet any additional demand.

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**5.7 Telecommunications**

Based on information provided by Palestinian Telecommunication Company, a main fiber optic cable connects Gaza Strip with Israel and abroad. This fiber optic cable passes through the REP site. The present route of this cable is shown in Figure 5.8. The depth of the cable ranges from a minimum of 1m to a maximum of 2m underground. As this depth is insufficient to protect the fiber optic cable from possible damage during construction of REP, about 2,200m of this cable should be re-routed. There are two possible routes; the first is to install it along the delimiting line with Israel, and the second is to install it under the main road of the REP. There is also a telephone manhole within the proposed REP site, which needs to be relocated.

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**5.8 Solid Waste**

In the Gaza Strip, there are four landfill sites; one serving Gaza City, one serving the Middle Governorate, one serving Rafah Governorate, and one serving the Northern Governorate. Gaza City also has a hazardous solid waste landfill, which serves the whole Gaza strip.

The nearest landfill site to the proposed REP site is the one that serves Rafah Governorate, located about 4.5 km to the north of the site. The Rafah landfill has been used since March 1999 for

domestic solid waste, and the expected capacity of the site is equivalent to 6-7 years of solid waste disposal. The monthly solid waste disposal to the site is estimated to be around 3,000 tons. The landfill site can be accessed through Sufa Access Road (a 12m-wide paved road).

The landfill can be expanded in the future, and the Municipality of Rafah has reserved an expansion area of 10 dunums. The current fee for solid waste disposal is 18 NIS per ton. The Municipality of Rafah has no objection to dispose the solid waste of the REP for a fee that will be agreed on with the REP developer.

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## **5.9 Existing Structures on the REP Site**

There are a few existing structures on the proposed site for Rafah Enterprise Park which will need to be demolished or relocated. These include:

- A chicken farm and building (about 500 m<sup>2</sup>);
- Two greenhouses (about 1,000 m<sup>2</sup> each);
- Two military watchtowers (6-7 meters high);
- A cemetery (about 100m<sup>2</sup>), and
- A telephone manhole.



## 6. Master Plan and Physical Facilities

### 6.1 Proposed Infrastructure Projects in the Gaza Strip

The main infrastructure projects proposed for the Gaza Strip over the next 10 years are concentrated primarily in the areas of water, wastewater, electricity, and roads. These projects (summarized below), as well as the existing infrastructure described in Chapter 5, are taken into account in developing cost schedules for additional infrastructure investment associated with the REP.

#### Water Projects

*Main carrier line collecting potable water from water wells, Mekorot, and the desalination plants:* This planned carrier line will be connected to booster pumps and storage reservoirs distributed throughout the Gaza Strip. As part of the Coastal Aquifer Management Program (CAMP), Metcalf & Eddy (a US engineering and consulting firm) will conduct the design of this carrier line. The first two phases of the carrier line will be implemented from Beit Lahia at the north to Wadi Gaza in the middle of Gaza Strip. The European Investment Bank and USAID have committed to funding the first two phases, which should be ready by the end of 2003. The third and fourth phases should be completed by 2005 and 2010, respectively.

There is also a project to construct a Main Seawater Desalination Plant at the Gaza Power Plant site, with a capacity of 50,000 m<sup>3</sup> of water per day. The plant is expected to be functional by 2005.

#### Waste Water Projects

*Construction of the north Gaza Waste Water Treatment Plant:* This project is being funded by the Swedish Government and will serve the Northern Governorate. The first phase of the treatment plant will have a capacity of 28,000 m<sup>3</sup>/day. The expected completion date for this phase is end-2003.

*Construction of the Middle Governorate Waste Water Treatment Plant:* Funding of DM 112 million is available from the German Government to construct the first phase, with a capacity of 80,000

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m<sup>3</sup>/day. The first phase of the plant will be functioning in 2007 and will serve Gaza City and Deir El Balah Governorate.

*Construction of Rafah and Khan Younis WWTP:* EURO 19 million is available from the European Investment Bank to construct the first phase of the plant. According to the PWA program, construction is expected to start in March 2001. In March 2003, the first phase of the plant should be completed, with a capacity of 30,000- 40,000 m<sup>3</sup>/day. The proposed site for the new WWTP is 6km to the north of the REP. The ground elevation of the WWTP site will vary from 58 to 62 above mean sea level.

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*Electricity*

The major new electricity project is the *Construction of the Gaza Power Plant (GPP)*, with a total capacity of 140MW. The first phase (48 MW) of the plant is under construction, and should be completed by December 2000. In addition, there are two electrical sub-stations to be constructed; one in the north and the second in the southern part of the Gaza Strip. The northern sub-station is under construction, along with the high-tension line that connects the GPP with the sub-station. According to the Palestinian Energy Authority, funding is secured to construct the southern sub-station along with the associated high-tension line. This sub-station is expected to be in place by the middle of 2003. The capacity of the southern sub-station is 60+60MW, located 4.4 Km to the north of the REP site.

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*Road Projects*

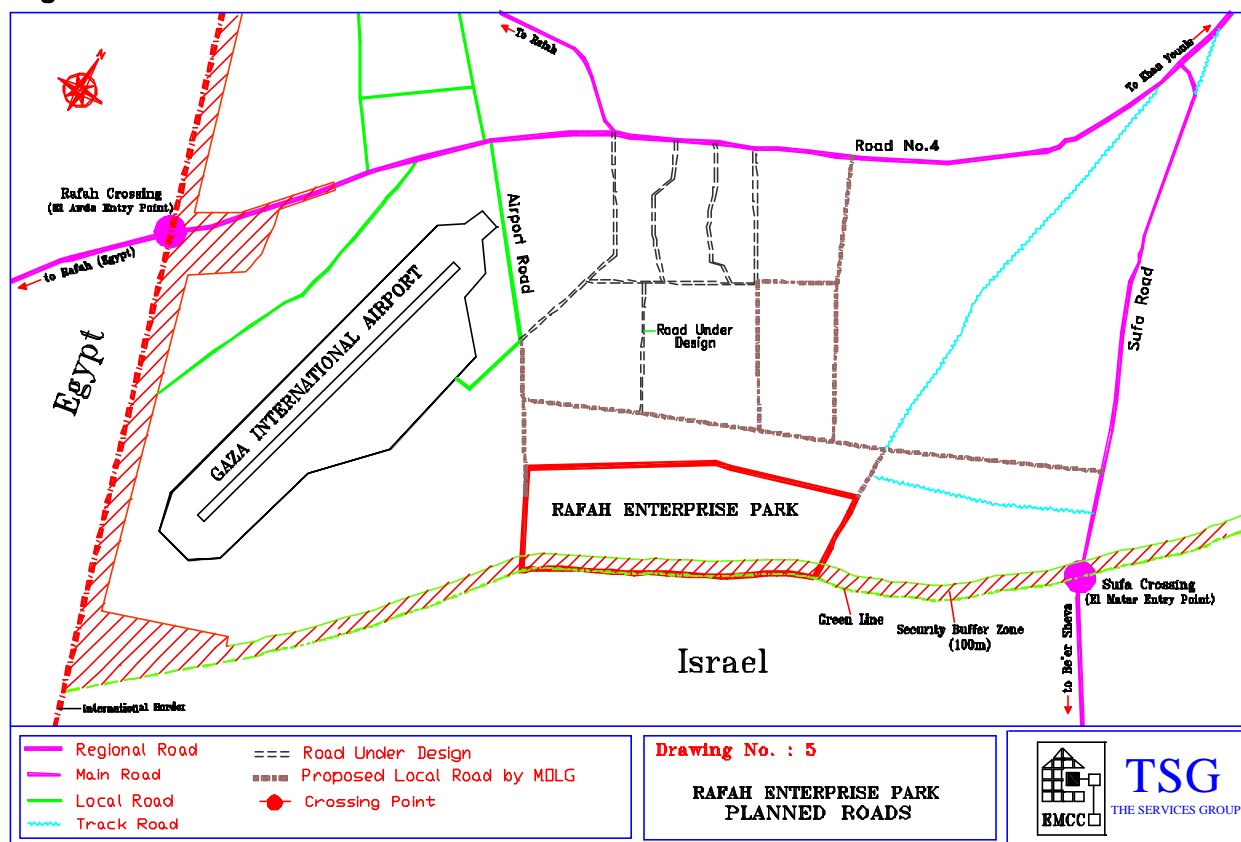
The Ministry of Local Governments issued an approved road plan for the internal roads in El Shoka Village in March 1997. Figure 6.1 presents these roads as planned. They are mainly grid roads with widths that range from 16m to 40m. The existing airport access road is planned to be 24m wide. However, a new 40m wide main access road to the airport is being planned. This road crosses Road # 4 and continues to the west, into the center of Rafah city.

A 16m wide road is planned at the extreme southeast of the El Shoka area, about 500m from the delimiting line between Gaza Strip and Israel. This road passes throughout the proposed.

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## Rafah Enterprise Park Feasibility Study

Figure 6.1: Planned Roads



location of the REP. Therefore, its location and planning should conform to the master plan of the REP

## Major Road Projects

Many road projects are being implemented in the Gaza Strip. Some of these projects include local or main roads in major cities. The largest project is the rehabilitation of Salah El Din Street and Road # 4, from Beit Hanoun in the north to the El Awda Crossing in the south, at the international border with Egypt. Several stages of this project have been completed, reaching up to the Wadi Gaza area. Additional stages are planned, but have been postponed due to a lack of funding. The ultimate goal of this project is a complete rehabilitation of the total length of Road # 4, up to El Awda Crossing. The planned width of the road is 53m, but only a section of about 30m is implemented in most areas.

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Development of El-Rashid Road, which runs parallel to the Mediterranean Sea, is one of the priorities set by MOPIC (Ministry of Planning and International Cooperation). It is included in the National Development Plan of Palestine. The road is planned to be developed with 40m width in urban areas and 60m in rural areas. MOPIC has also planned the construction of a main road within the 100m security buffer zone that runs parallel to the greenline (see Figure 6.6). However, neither a detailed design nor a budget funding allocation has been made for these projects.

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*Airport Expansion*

The Gaza International Airport has been recently constructed and put into operation. Currently, it handles only two to three flights per day. Future expansion projects include the construction of a cargo facility. However, no detailed plans for this expansion are available.

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*Proposed Seaport Project*

The new Gaza Seaport is proposed in the Gaza Governorate, to the south of Gaza City. Construction of this project was expected to start in March 2000. Detailed design and contracts were completed early this year. It is understood that funds for this project have been made available.

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**6.2 Planning Context and Challenges**

The selection of the REP site was a result of a series of studies. The following discussion summarizes the site selection process and the historical development of the project:

- In December 1997, the Ministry of Planning and International Cooperation published the "Regional Plan for Gaza Governorates (1998-2015)," which identified approximately 260 hectares of land between Gaza International Airport and Al Matar entry point (also known as Sufa Crossing) as suitable for industrial purposes.
- In February 1999, the Ministry of Industry and PIEFZA initiated a Palestinian-Israeli joint committee to oversee the Industrial Park project.

- In March 1999, a Memorandum of Understanding (MoU) was signed by Minister of Industry, Dr. Sa'adi El-Kroonz, and Mr. Stef Wertheimer, President of ISCAR Ltd. This MoU defined a working team whose function was to promote an Israeli-Palestinian Industrial and Trade Park project in southern Gaza Strip. It was envisioned that Egypt in the future might develop an industrial area to be integrated to this project (see Figure 6.1a). The team determined the guidelines and methodology for implementation of the project.
- In April 1999, PIEFZA formed a technical team that carried out a pre-feasibility study.
- In August 1999, a Concept Paper that presents the principles regarding establishment of an Israeli-Palestinian Industrial and Commercial Cooperation Zone was prepared.
- In September 1999, The Services Group, under its USAID-funded SITE Project, carried out a survey of sites that are suitable for development of industrial estates in West Bank and Gaza. This study highlighted the location in Rafah as being suitable for industrial estate development.
- In November 1999, a second MoU was signed between Minister of Industry, Dr. Sa'adi El-Kroonz, Mr. Stef Wertheimer, Chairman of ISCAR, Mr. Mohamed Rachid, Chairman of Palestinian Commercial Services Company (PCSC), and Mr. Sabeh Massri (on behalf of PIEDCO). The objective of the MoU was to establish a multi-purpose industrial zone.
- In March 2000, The Services Group, under the USAID-funded SITE Project, started the feasibility study for an Industrial Park at Rafah. The proposed site for the Industrial Park was determined by PIEFZA to be about 2,700 dunums. However, the location and size of the site was revised twice by PIEFZA – first to 1,960 dunums and subsequently to 1,475 dunums - during the course of the study.

Figure 6.1a: Joint Industrial Project



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### 6.3 Implications of the Industry Demand Analysis

The Master Planning of the Rafah Enterprise Park is based on the demand analysis described in Chapter 4, which developed a demand projection for the project. This projection determined the phased development of REP. The demand assessment identified a number of priority industries and industry niches that are likely to locate in the REP:

- **Medium-Intensity Industries.** Demand by medium-intensity industries is projected as the most significant component of demand during the development of the REP. Typical investments include activities such as manufacturing and assembly of consumer electronics and electrical appliances (white goods); food and beverages processing of local agriculture products (citrus, tomatoes, herbs) and confectionery and baked goods; manufacturing of rubber and plastic products, including household goods and flexible and non-flexible packaging, building and construction materials, spare automotive and machine parts; manufacturing of flexible and non-flexible paper packaging; spinning and weaving of textiles for local and Israeli apparel sectors; and manufacturing and assembly of toys and games.
- **Light Intensity Industries.** Demand by light-intensity industries composes the second largest group of activities, which includes apparel assembly, assembly of footwear and leather products, and furniture assembly. This demand is also supported by the natural growth of the local Gazan economy. These local investors will require a range of smaller facilities, to be provided through flexible, sub-dividable structures.
- **Logistics and Warehousing.** Given the REP's strategic location - based on its proximity to the Gaza International Airport, two borders (green Line and Egypt), and plans for a port only 30 kilometers away – investments in logistics and warehousing facilities will represent a small but important component of overall demand. Activities in this group include storage, packaging and re-packaging, distribution centers, courier services, and freight forwarding/cargo handling. These

## Rafah Enterprise Park Feasibility Study

investors will require larger facilities than manufacturing investors.

- **Enterprise Development Center.** The EDC, given its specific set of entry criteria, will likely attract investments in activities such as: Manufacture of export-quality wood and metal office furniture; pilot manufacturing of consumer electronics and electronics components; flexible and non-flexible packaging (paper and plastic) for Israeli and REP-based exports (including IT, electronics, and other consumer products); assembly of toys and games (e.g. wheeled toys, plastic-molded and metal model assembly kits, plastic and metal construction sets, plastic and stuffed figurines, puzzles). These activities include a combination of medium- and light-intensity activities.

## Enterprise Development Center

The demand for serviced space in the Enterprise Development Center is summarized in Table 6.1.

Table 6.1: Demand for Serviced Space in Enterprise Development Center

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14
Hectares (gross)	2880	2880	2880	2995	3115	3239	3369	3503	2803	2242	1794	1435	1148	918
Cumulative (m2)	2880	5760	8640	11635	14750	17989	21358	24861	27664	29906	31700	33135	34283	35201

## Industrial Park

The demand for land in the REP Industrial Park is summarized in Table 6.2.

Table 6.2: Demand for Raw Land to be developed in the Industrial Park

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Years 11-15	Years 16-19
Medium Intensity	2.54	3.81	5.08	5.44	5.82	6.23	6.66	5.66	4.81	4.09	2.58	1.23
Light Intensity	0.98	1.75	1.75	1.87	2.00	2.14	2.29	1.94	1.65	1.40	1.02	0.42
Warehousing	0.32	0.56	0.56	0.60	0.64	0.69	0.74	0.63	0.53	0.45	0.27	0.14
Total (ha)	3.84	6.12	7.39	7.91	8.46	9.06	9.69	8.24	7.00	5.95	3.54	1.65
Cumulative (ha)	3.84	9.96	17.35	25.26	33.73	42.78	52.47	60.71	67.71	73.66	91.37	97.98



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#### **6.4 Master Planning of the Rafah Enterprise Park**

The following assumptions were made in preparation of the Master Plan for Rafah Enterprise Park:

- There is an agreement and mutual understanding between the Palestinian and Israeli Authorities to establish an industrial zone in Rafah.
- A “sister” industrial zone is planned to be located on the Israeli side near the Kerem Shalom area, facing the Rafah Enterprise Park.
- Future co-operation/integration with a proposed Industrial Zone in Egypt is envisaged.
- Gaza International Airport will become commercially viable and, cargo and shipping facilities will be built by 2003.
- It is assumed that part of REP can be built within the 500m security buffer between the Gaza Strip and Israel.

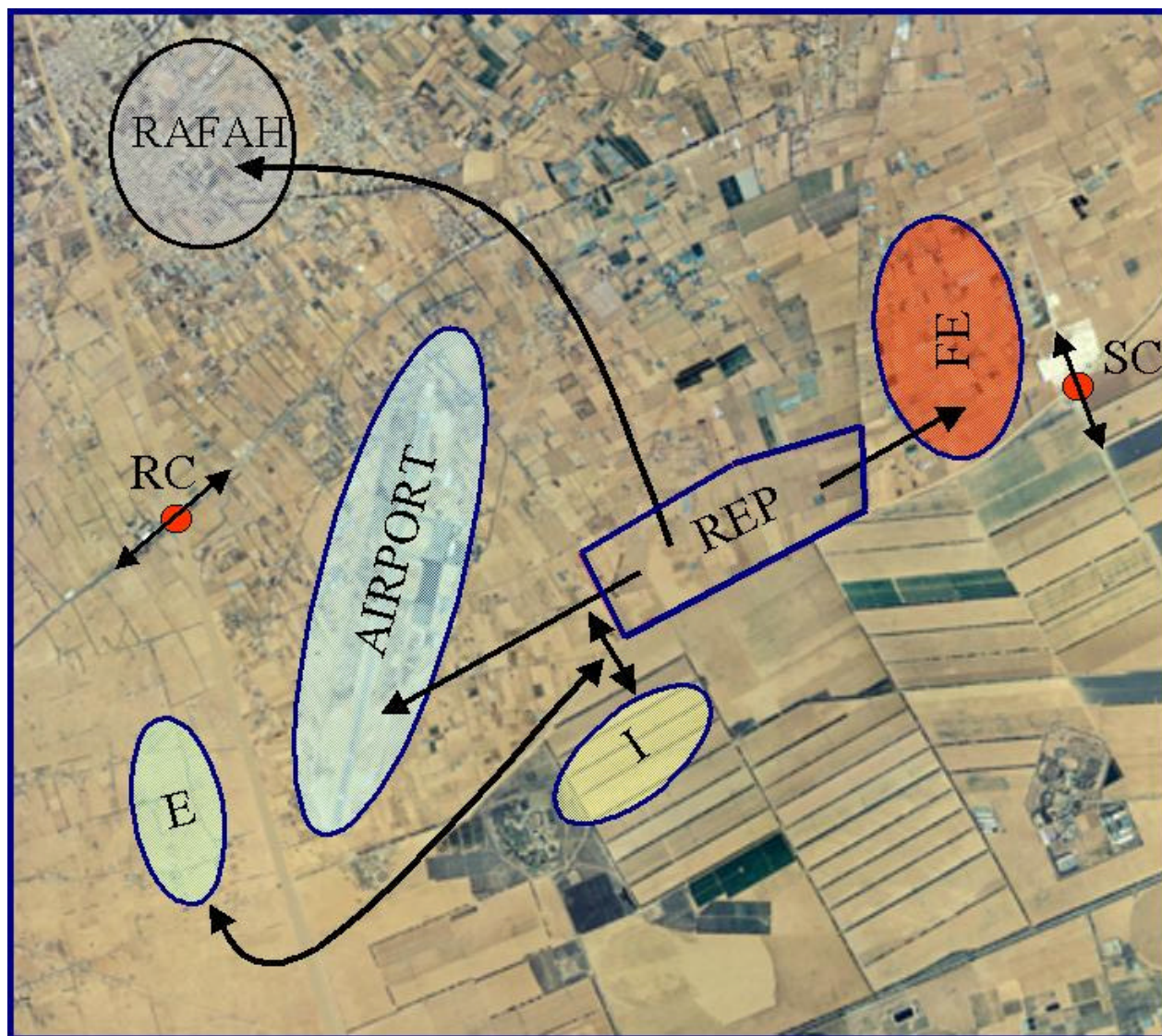
The Master Plan was prepared with a development approach that took the following criteria into consideration:

- **Maximization of Land Use.** It is very important to provide a logical framework for the zoning of the industrial activities and to maximize the efficiency of land use and infrastructure provision within the REP. It is also important to provide flexible site layouts, which minimizes conflicts between different industrial activities and can accommodate changing industrial requirements.
- **Minimization of Total Cost.** The site is developed on the basis of a grid system in order to minimize the cost of onsite infrastructure. The sizes of plots are defined based on the industrial demand, as discussed in Chapter 4.
- **Minimization of Environmental Impacts.** Environmental impacts will be minimized by providing good quality

landscaping and structural planning. This will also be achieved by incorporating green areas and extensive tree planting along the boundaries of the site.

The site is planned taking into account the possible future expansion of the REP (denoted by FE in Figure 6.2). Access to Rafah, the Gaza International Airport, the proposed Israeli industrial area (denoted by I in Figure 6.2), and a possible connection with an industrial area in Egypt (denoted by E in Figure 6.2) are considered. The current connections to Egypt and Israel are possible through the Rafah Crossing (denoted by RC in Figure 6.2) and through the Sofa Crossing (denoted by SC in Figure 6.2).

Figure 6.2: REP Site and Anticipated Egyptian and Israeli Industrial Sites



- REP = Rafah Enterprise Park  
FE = Future Expansion  
I = Proposed Israeli Industrial Area  
E = Proposed Egyptian Industrial Area  
RC = Rafah Crossing  
SC = Sufa Crossing

**Planning Ratios**

The total area available for development, 147.5 hectares, was planned using the following target ratios:

- The target ratio of serviced land to raw land area was taken as 70 percent. Thus, common areas including administration buildings, roads, parking areas, green areas, and engineering utilities were designed to occupy about 30 percent of the total site area.
- The target ratio of under-roof area to serviced land applied to the master plan was selected as 60 percent.

The above ratios were selected based on the previous experience of the planning team, and on a comprehensive survey of other industrial areas in West Bank/Gaza, Israel, and Jordan. The planning team was unable to identify any pre-determined development standards or adopted ratios for development of industrial areas by Palestinian institutions.

**Table 6.3: List of Design Ratios in Other Industrial Developments**

	Serviced land / raw area	Under roof area / raw area	Under roof area / serviced area	Total available raw area (m <sup>2</sup> )
Nablus IE (West Bank)	60%	33%	55%	256,000
Gaza IE (Gaza)	73%	57%	78%	487,000
Upper Nazareth IZ (Israel)	55%	25-33%	45-60%	1,176,000
Karmeal IZ (Israel)	53%	25%	47%	650,000
Tamra IZ (Israel)	64%	32%	50%	370,000
Kaffer Kanna IZ (Israel)	63%	31%	50%	69,000
KITE (West Bank)	10.5%	n/a	40%	250,000
Aqaba IE (Jordan)	70%	42%	60%	1,300,000

**6.5 REP Development**

One of the basic principles adopted in preparing the REP Master Plan was to develop a flexible plan than can be gradually implemented. The REP Master Plan yields a 41 percent land use. The actual ratio of serviced land to raw land is 61 percent (vs. a planning target of 70 percent), and the actual

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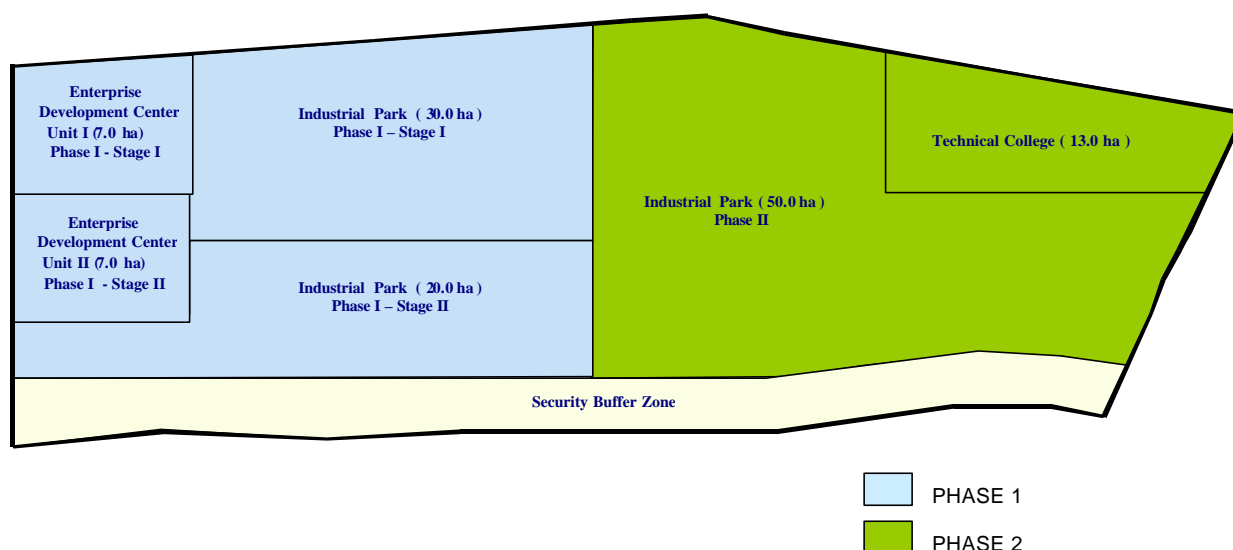
ratio of under-roof to serviced area ratio is 67 percent (vs. a planning target of 60 percent). Actual ratios differ slightly from target planning ratios due to optimal fixed sizes of some plan components.

## Project Phasing

The proposed master plan is based on the market demand survey results and considered the demand for a Technical College as expressed by the Ministry of Industry. Responding to the demand figures presented earlier, the implementation of the project is planned to be in two development phases (see Figure 6.3):

- The first phase includes the development of 14 ha for the Enterprise Development Center (7 hectares each unit), as well as 50 ha for the Industrial Park.
- An area of 50 ha for possible future expansion of the Industrial Park and 13 hectares for the Technical College comprise the second development phase.

**Figure 6.3: Master Plan Components and Phasing**



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*Master Plan Components*

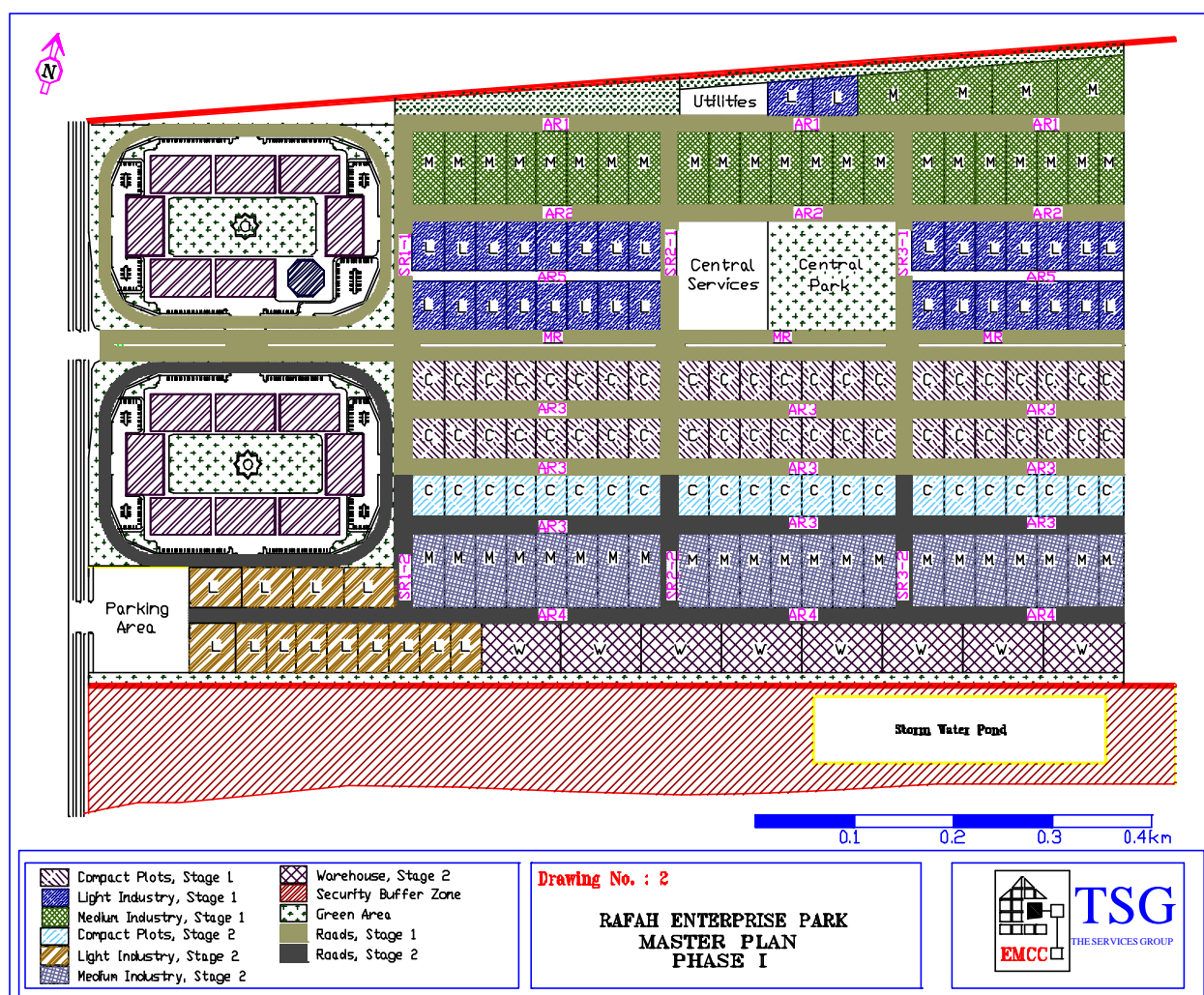
The main components of the Master Plan are:

- Industrial Park (IP)
- Enterprise Development Center (EDC)
- Area for Future Expansion of the Industrial Park, and
- Technical College Campus.

**Figure 6.4: Rafah Enterprise Park Master Plan Phase 1**



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*Industrial Park*

The industrial park will occupy a total area of about 50 hectares per phase. A variety of industries will be accommodated in the industrial park – mainly light and medium industries. The site is planned to accommodate four basic categories of plots. There are 66 Compact plots mainly for Local Businesses, 45 plots for mainly Light Industries, 48 plots mainly for Medium Industries, and 8 plots for Logistics/Warehousing (see figure 6.4). The REP Master Plan groups similar sized plots together so that activities of similar nature and scale locate together. However, the Master Plan does not provide a distinct zoning plan to offer greater flexibility to potential investors while locating to the REP.

The Industrial Park plan also includes an area for central services buildings and a park. A total area of 10,000m<sup>2</sup> is allocated for public facilities, including a clinic, police station, fire station, and a mosque. This facility also includes an administration center and banking and other commercial activities to serve the investors and workers in the Rafah Enterprise Park.

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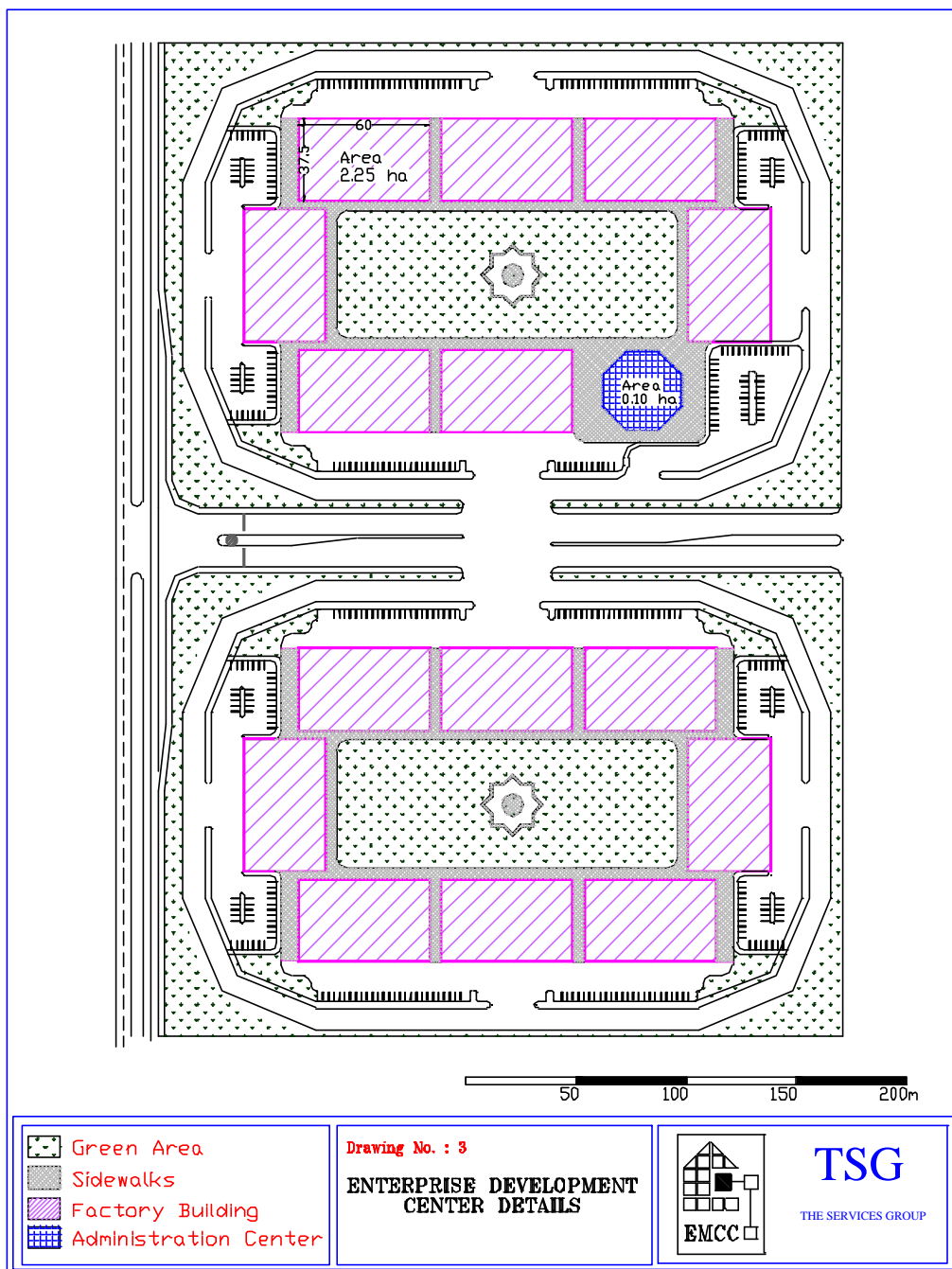
*Enterprise Development Center*

The EDC is composed of two modules (units) of approximately 7 hectares each, and is based on the Tefen industrial incubation model. The units are designed to host smaller, export-oriented, environment friendly industries utilizing technology-intensive production methods. The EDC will be fully serviced with basic infrastructure services including electricity, telecommunication, sewage system, water, and roads.

The EDC is planned for a total area of about 14 hectares (140 dunums). It will be constructed in two stages, starting with the western unit that will host an administration and services center in addition to 7 production buildings. The eastern unit is planned to contain 8 production buildings. Figure 6.5 presents the details of the EDC.



Figure 6.5: Enterprise Development Center Details



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<i>Area for Future Expansion of the Industrial Park</i>	An area of 50 hectares is reserved for a phase 2 expansion of the Industrial Park. In order to maintain the integrity of the industrial park, the future expansion area is located adjacent to the first phase.
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<i>Technical College Campus</i>	The master plan accommodates the introduction of a proposed Technical College. A total area of 12.5 hectares is allocated for such a Technical College, which is envisioned to supply the industrial park businesses with qualified graduates while the Industrial Park will offer training possibilities for the students.
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<i>Construction Stages</i>	<p>The first phase of REP development is planned in two consecutive stages:</p> <ul style="list-style-type: none"> <li>▪ Stage 1: EDC Unit 1 (7.0 hectares) and 30 hectares of the Industrial Park</li> <li>▪ Stage 2: EDC Unit 2 (7.0 hectares) and 20 hectares of the Industrial Park</li> </ul> <p>In Stage 1, first EDC unit is to be constructed including 7 units of factory buildings as well as an administration building. In addition, out of the 50ha allocated for the Industrial Park, 60 percent (30ha) will be developed in the first stage. These 30 hectares include the construction of 44 compact plots, 32 plots for light industry and 26 plots for medium industry. The central services building and the central park will be constructed in the first stage of phase I. Based on market demand analysis, the units constructed in the first stage are expected to be fully occupied within 5.5 years.</p> <p>Also in Stage 1, the main entrance road (PR2) will be constructed. During this stage, the demand for the REP is expected to be relatively low, and traffic is expected to remain light. It is anticipated that the existing 12m Airport Access Road</p>
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will be able to handle traffic flow during the first stage. Access to the Sufa Crossing will be available via Road # 4 through the existing 12m wide Sufa Crossing Road (PR6), as the traffic density is not expected to reach levels that will justify the construction of the new proposed Sufa Access Road (PR5) at this stage.

Access to El-Awda Crossing will be available through the existing roads<sup>1</sup>.

MR1 (the section of the Main Road that falls within the boundaries of Phase 1), Secondary Roads (SR1-1, SR2-1 and SR3-1) and Access Roads (AR1, AR2, two rows of AR3 and AR5) will also be constructed in the first stage. The construction of the above on-site roads is vital in this stage in order to encourage investors and enhance accessibility to the Industrial Park.

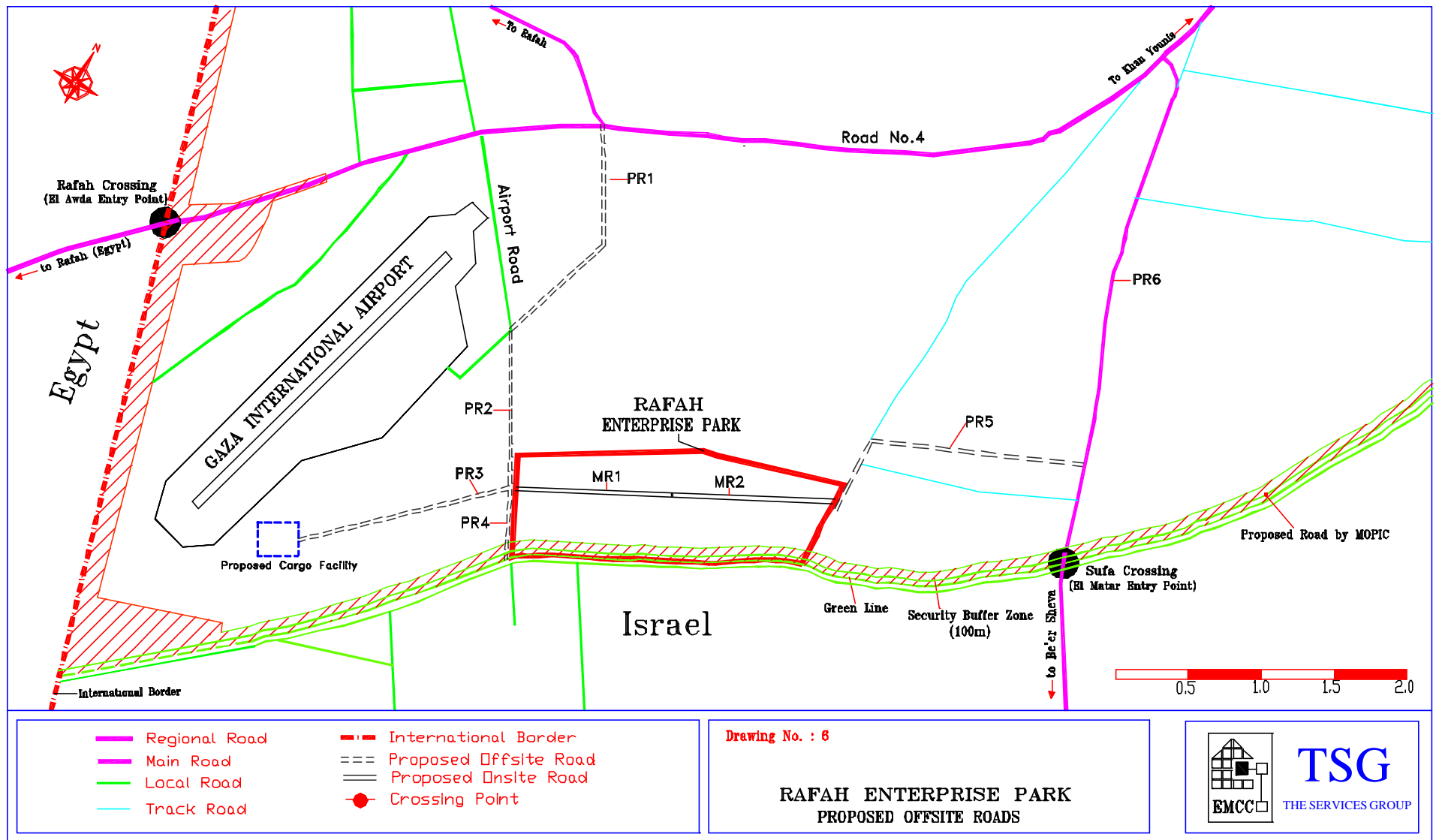
Stage 2 of Phase 1 starts 3 years after the start of construction of Stage 1. In this stage, the second EDC unit consisting of 8 buildings will be constructed, as well as the remaining 40 percent (20 ha) of the Industrial Park. The Industrial Park construction will continue to include 22 more compact plots, 13 more plots for light industry businesses and 22 more plots for medium industry businesses. In this stage, 8 warehouse plots will also be serviced.

In Stage 2, construction of the following proposed offsite roads is expected to be completed. While the REP Main Access Road (PR1), the Airport Access Road (PR3), and 1.6 km section of the Sufa Access Road (PR5) will be planned and financed by others, 0.5 km section of the Sufa Access Road (PR5), and the Israeli Industrial Estate Access Road (PR4) will be planned and financed by donor agencies in support of the REP. By the start of this stage, it is expected that construction of the Israeli Industrial Estate and the cargo handling facility at the airport will have started. The widening and rehabilitation of Sufa Crossing Road (PR6) is also recommended at this point.

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<sup>1</sup> See section 6.6 for a more detailed discussion of the REP road access network.

Figure 6.6: Proposed Offsite Roads for the REP



The remaining Secondary Roads (SR1-2, SR2-2, SR3-2) and Access Roads (third row of AR3 and AR4) will be constructed in Stage 2. MR2, the segment of the Main Road between the end of Phase 1 and PR5, is also to be constructed in this stage.

The details of offsite and onsite roads are described in Section 6.6. The following sections present the details of infrastructure construction over the course of the REP development.

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## 6.6 Road Network

Several new roads are proposed in the master plan of REP. These roads are necessary to connect the REP with the surrounding area and adjacent facilities. Both offsite and onsite roads are presented in this section.

### Offsite Roads

Three main roads (PR2, PR4 and PR5) are necessary to connect the REP with the surrounding area. The minimum practical width of these roads is 12 m. This allows for a single carriageway of 8m for both directions of traffic (4m for each direction), in addition to two 2m wide sidewalks. This provides an estimated capacity of about 1300 pc/hr/ln under ideal conditions. These roads are presented in Figure 6.6 above and described below. It should be noted that the main road intersections need careful detailed design to cater for the new demand of traffic flow. The intersection between Road #4 and the road leading to the airport and the REP needs special attention.

- **The REP Main Access Road (PR1).** This road will serve as the main entrance to the proposed REP from Road # 4 (Salah El Din Road). It is proposed to be 40 m wide, following the approved plan by the Ministry of Local Governments. Its length is about 1,800m. It continues to the main entrance of the Gaza International Airport. Off this road, PR2 Road is planned to reach to the main entrance of the REP site. The construction of PR1 is recommended to start in Phase 1 Stage 2. The construction of Road PR1 may be funded by MoLG, the Airport Authority, or both, as it was planned by MoLG to serve the Gaza International Airport.

- **Main Entrance Road (PR2).** The REP main entrance road connects PR1 with the main entrance of the REP. The minimum practical width of a road is 12 m. This allows for a single carriageway of 8m for both directions of traffic (4m for each direction), in addition to two sidewalks 2m wide each. This provides an estimated capacity of about 1300 pc/hr/ln in ideal condition. It is about 1,200m long, and can initially be constructed as 12m wide. However, as the REP develops it can be widened to reach its full planned width of 24m. This width allows for a dual carriageway with 2 lanes in each direction, on street parking on both sides and a 2m sidewalk on each side. The road is planned to have full infrastructure utilities, including wastewater pipelines, water supply, electricity and telephone networks, as well as road lighting poles. The construction of this road will start in Phase 1 Stage 1. The cost of PR2 is expected to be covered by PIEFZA with the help of some donor countries and/or international donor agencies.
- **The Airport Access Road (PR3).** It is proposed to connect the REP with Gaza International Airport. This access road to the Airport is proposed to be 16 m wide. It is about 1,800 m long. The road is planned to have minimum infrastructure utilities, such as lighting poles. The main purpose of this road is to connect the REP with the planned cargo facility at the airport. The construction of this road will start in Phase 1 Stage 2. The cost of PR3 is expected to be covered by the Airport Authority.
- **Israeli Industrial Park Access Road (PR4).** This is a 24m wide road that continues from PR2 to the borderline with Israel. It is about 400m long on the Palestinian side. It is anticipated to continue on the Israeli side. The main purpose of this road is to provide a quick and efficient connection with the proposed Israeli Industrial Estate at Kerem Shalom. A new crossing checkpoint with Israel will be required at the end of this road. The construction of this road will start in Phase 1 Stage 1. The cost of this road is expected to be covered by PIEFZA with the help of some donor countries and/or international donor agencies.

- **Sufa Access Road (PR5).** This road is planned to connect the REP to Israel through the Sufa Crossing. It starts from the northeastern boundary of the REP, moves to the north and then extends further east to reach the existing Sufa Road (PR6). It is proposed to be 24m wide inside the REP and 30m wide outside the REP. The total length of this road is about 2,100m. It is planned to have full infrastructure utilities, including wastewater pipelines, water supply, electricity and telephone networks, and road lighting poles. The construction of this road will start in Phase 1 Stage 2. The cost of this road may be recovered by PIEFZA.
- **Sufa Crossing Road (PR6).** This is an important existing road that leads to the Sufa Crossing Checkpoint. Its existing width is only 12m of paved asphalt. The importance of this road is anticipated to increase after the development of the REP. Therefore, the master plan suggests widening this road to 24m of paved width. The proposal also includes road lighting poles. The construction of this road will start in Phase 1 Stage 2.
- **Borderline Road.** A future main road is proposed by the Palestinian Ministry of Planning and International Cooperation (MOPIC). It is to be located within the 100m security buffer zone along the border with Israel. The possibility of implementing this road is not yet certain, and it is not accounted within the project budget. However, if implemented, it will provide easy access from the REP to the proposed Egyptian Industrial Area.
- **Israeli Industrial Park Access Road (on the Israeli side).** This is a continuation of the proposed Israeli Industrial Park Access Road in the Palestinian side (PR4). It should be constructed following the development of the Industrial Area on the Israeli side. The cost of this road is expected to be incurred by the developers of the Israeli Industrial Park.

Table 6.4: Summary of Proposed Roads

Road Name	Road #	Width (m)	Length (km)	Start of Construction	Notes
The REP Main Access Road	Road PR1	40	1.8	Phase 1 Stage 2	Also planned by MOLG and will be financed by others
Main Entrance Road	Road PR2	24	1.2	Phase 1 Stage 1	Also proposed by MOLG
The Airport Access Road	Road PR3	16	1.8	Phase 1 Stage 2	New proposed road will be planned by the Airport Authority and financed by others
Israeli Industrial Estate Access Road	Road PR4	24	0.4	Phase 1 Stage 1	New proposed road
Sufa Access Road	Road PR5	24	2.1	Phase 1 Stage 2	1.6km of this road is planned by MOLG and will be financed by others
Sufa Crossing Road	Road PR6	24	3.5	Phase 1 Stage 2	Widening from 12 to 24 m

### Onsite Roads

Three main road categories are planned for onsite roads in REP: main roads, secondary roads, and access roads. They are planned in a grid system to provide easy and direct access to all industrial units. All roads provide 2m sidewalks on each side with the exception of Access Road AR5 with 1.5m sidewalks. This space combined with the 5m setbacks in front and back of all buildings provides enough space for pedestrian movement. The road hierarchy system is selected to provide efficient and economical infrastructure facilities. All onsite roads will be paid for by the developer(s) of the REP.

- **Main Road (MR1 and MR2).** The main road passes through the REP site, starting from the entrance and ending at the eastern boundary. This road has an estimated capacity of 1300 pc/hr/ln and a total capacity of 5200 pc/hr. The width of the main road (MR1 and MR2) was selected to be 30m and will be wide enough to



accommodate all types of vehicles. It will be a dual carriageway separated by a 3m wide central island. Each carriageway will have two lanes 3.25m each, in addition to on-street parking places. Parking will be on 90° stalls to achieve the maximum number of parking spaces available. Two meters wide sidewalks are provided on both sides of the road. MR1, the segment of this road that falls within the boundaries of Phase 1, will be constructed in Phase 1 Stage 1. MR2, the segment between the boundaries of Phase 1 and PR5, will be built in Phase 1 Stage 2.

- **Secondary Roads (SR).** Secondary roads are planned perpendicular to the main road. These roads have an estimated capacity of 1000 pc/hr/ln and a total capacity of 2000 pc/hr. The width of all secondary roads was selected to be 16m. This provides a two-way road with one lane (3.5m wide) in each direction. On-street parking is provided on both sides as well as 2m wide sidewalks. SR1-1, SR2-1, and SR3-1 will be constructed in Phase 1 Stage 1, while SR1-2, SR2-2, and SR3-2 will be constructed in Phase 1 Stage 2.
- **Access Roads (AR).** Access roads are also 16m wide. They provide access to each industrial unit. AR1 and AR2 will be constructed in Phase 1 Stage 1, while AR3 and AR4 will be constructed in Phase 1 Stage 2.

Figures 6.7 and 6.8 present the cross-sectional drawings of the proposed roads.

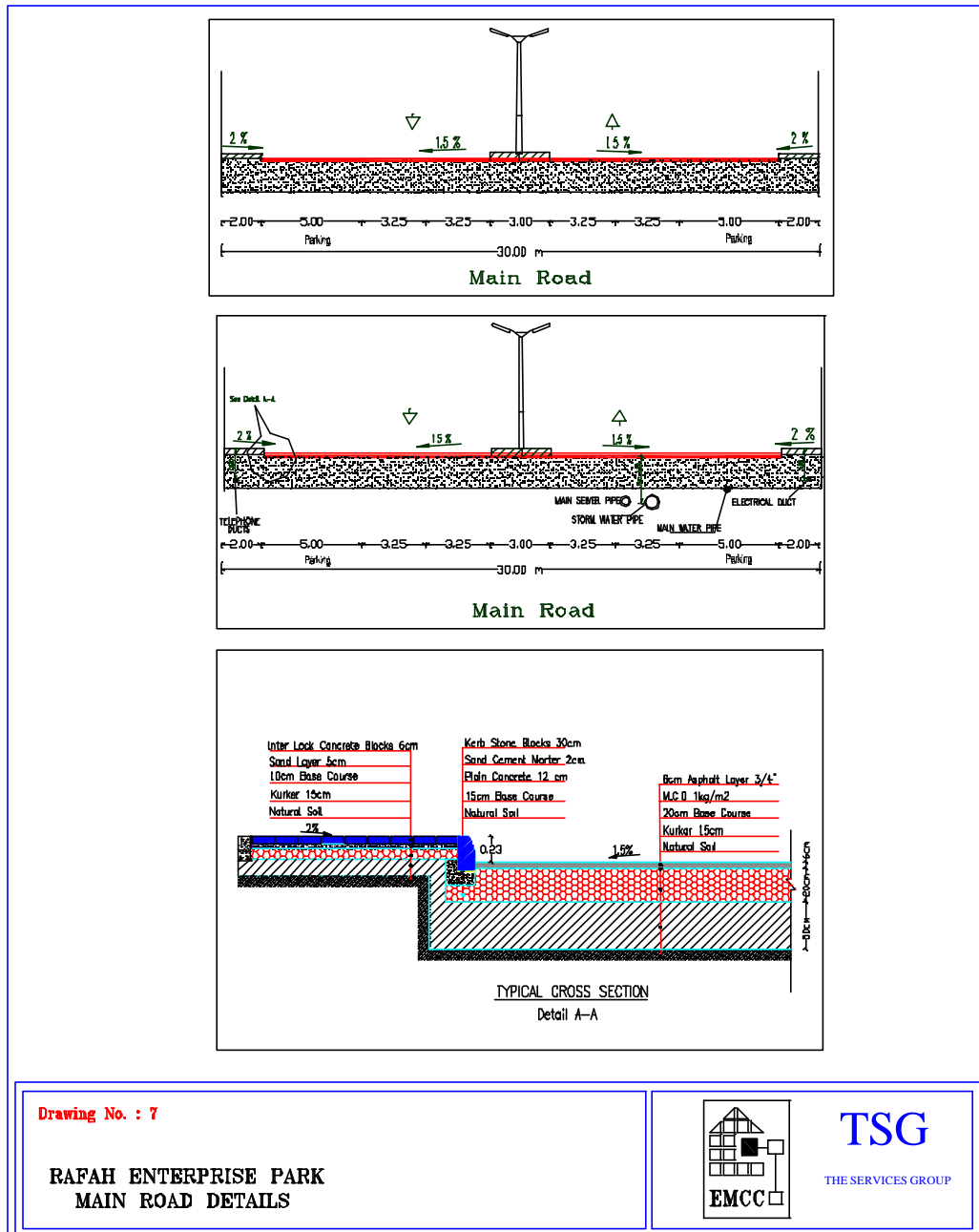
**Table 6.5: Summary of Onsite Roads**

	Road #	Width (m)	Length (km)	Start of Construction
Main Roads	MR1	30	1.1	Phase 1 Stage 1
	MR2	30	1.0	Phase 1 Stage 2
Secondary Roads	SR1-1, SR2-1, SR3-1	16	1.0	Phase 1 Stage 1
	SR1-2, SR2-2, SR3-2	16	0.6	Phase 1 Stage 2
Access Roads	AR1, AR2	16	1.5	Phase 1 Stage 1
	AR3, AR4	16	1.5	Phase 1 Stage 2

	AR4	16	0.3	Phase 1 Stage 2
	AR5	10	0.5	Phase 1 Stage 2

**Figure 6.7: Proposed Main Road Cross-sections**

Rafah Enterprise Park Feasibility Study



Drawing No. : 7

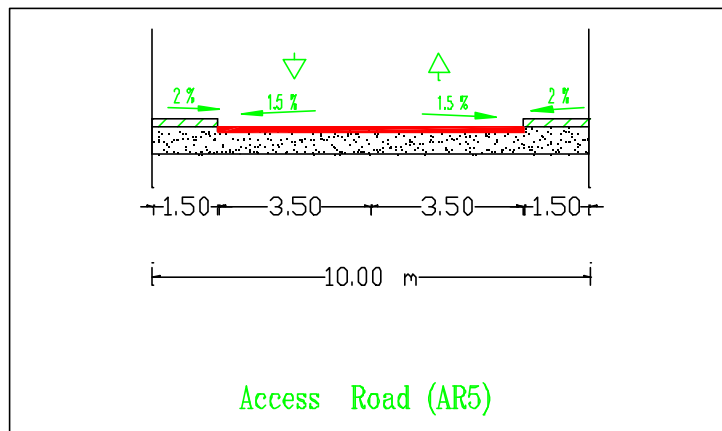
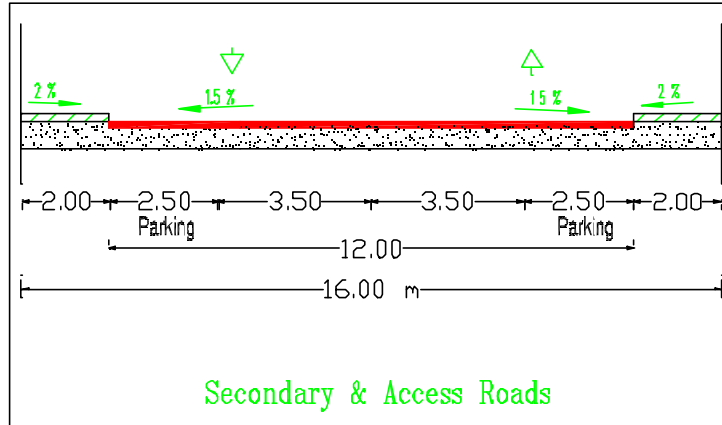
RAFAH ENTERPRISE PARK  
MAIN ROAD DETAILS



**TSG**  
THE SERVICES GROUP

**Figure 6.8: Proposed Secondary and Access Road Cross-sections**

Rafah Enterprise Park Feasibility Study



Drawing No. : 8

RAFAH ENTERPRISE PARK  
ROADS DETAILS



TSG

THE SERVICES GROUP

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## 6.7 Water Supply and Wastewater Treatment

### *Water Demand*

In order to identify the available options for supplying the REP with water, the water demand had to be defined. Two basic assumptions were made in calculating the water demand for the REP:

- REP targets those industries that are not large water consumers.
- Estimates of the water demand for the REP are based on the parameters applied in similar developments in the region.

Water consumption in the three existing industrial zones in Gaza Strip (Beit Hanoun, Deir El Balah, and the Gaza Industrial Estate) is 5.3, 14.5 and 3.8 m<sup>3</sup>/day per dunum of building area, respectively. The relatively high water consumption in Deir El Balah industrial zone is due to the fact that all industries in the zone are engaged in food processing, whereas in Beit Hanoun, the industries are mix of medium and low water consuming industries. The feasibility study for the Nablus Industrial Estate (to be located in the West Bank) estimates the total water demand at 5.25m<sup>3</sup>/day per dunum of building area.

In Jordan, the water demand for Amman and Al Hassan Industrial Estates has been estimated to be 3m<sup>3</sup>/day per dunum of building area. For the proposed Aqaba Industrial Estate (to be located at southern Jordan), water demand has been estimated to be 5m<sup>3</sup>/day per dunum of building area. Table 6.6 summarizes these figures.

**Table 6.6: Water Consumption and Demand in Similar Industrial Areas**

Industrial Area	Location	Consumption/ Demand (m <sup>3</sup> /day/ dunum of building area)	Remarks
Gaza IE	Gaza Strip	3.8	Light industries
Deir El Balah IZ	Gaza Strip	14.5	Food processing industries
Beit Hanoun IZ	Gaza Strip	5.3	Light and medium industries
Nablus IE	West Bank	5.25	Design figure for light and medium industries
Amman IE	Jordan	3	Design figure for light and medium industries
El Hassan IE	Jordan	3	Design figure for light and medium industries
El Aqaba IP	Jordan	5.0	Design figure for light and medium industries
Omer Industrial Park	Israel	7.5	Hi-technology and engineering industries

In summary, water demand ranges from about 3 to 6 m<sup>3</sup>/day per dunum of building area for industrial areas. It is important to note that Omer Industrial Park is based on a different model, with a different ratio of built up to raw area than other Industrial Estates and hosts different types of industries.

For the REP, the water demand is estimated with 4.5 m<sup>3</sup>/day per dunum of building area for the Industrial Park (IP) and 6 m<sup>3</sup>/day per dunum of building area for the Enterprise Development Center (EDC). Considering that the ratios of built-up to raw land area are 0.45 and 0.25 for the IP and EDC respectively, the estimated demand can be translated to 2.0 and 1.5m<sup>3</sup>/day per dunum of raw area for the IP and EDC, respectively.

### Water Supply

Offsite water supply involves waterline from the source to the REP and the construction of ground and elevated tanks, and a booster pump station.

Before discussing water supply options, the development phases for REP are summarized below:

- Phase 1: Construction of the Enterprise Development Centers (about 14ha) and Industrial Park (about 50ha)

- Phase 2: Construction of Phase 2 of Industrial Park (an additional 50ha) and the Technical College Campus (about 13ha)

The total demand for the two phases is summarized in Table 6.7.

**Table 6.7: Estimated water demand for the REP**

	Phase 1			Phase 2			Total Demand (m3/day)
	Raw Area (dunum)	Demand Rate (m3/day/dunum)	Phase 1 Demand (m3/day)	Raw Area (dunum)	Demand Rate (m3/day/dunum)	Phase 2 Demand (m3/day)	
EDC	140	1.5	210	-	-	-	210
IP	500	2.0	1,000	500	2.0	1,000	2,000
Technical College	-	-	-	130	1.0	130	130
<b>Total</b>	<b>640</b>		<b>1,210</b>	<b>630</b>		<b>1,130</b>	<b>2,340</b>

For the purpose of evaluating the offsite water supply options, the two phases will be considered separately. The total daily demand for the first phase is about 1,210m<sup>3</sup> per day. To provide this quantity for the REP, four options are considered:

- Option 1.** *Digging a new water well at the western part of Rafah (El Hashash area), with a capacity of 70-80 m<sup>3</sup>/hr.* This option will require the installation of about 11 km of 200mm UPVC pipe from the well to the ground reservoir to be located at the “utilities area” (see figure 6.4) of the REP. The required capital investment for this option is summarized in Table 6.8.

Digging the well calls for licensing from the Regulations and Licensing Department of Palestinian Water Authority. The developer has to apply for digging a well, indicating the purpose of using the water and the quantity required. PWA would study the application and specify the exact location and the allowed discharge rate of the proposed well. Developer(s) must cover all construction, operation and maintenance costs, if they are granted a license to dig a well. However, efforts are ongoing for



establishment of the Coastal Utility Company for water and wastewater services. Once this company becomes operational, it is expected that all the domestic water wells will be taken over by the firm, and all water consumers will be asked to pay for the water they consume according to the tariff introduced.

To date, there is no unified water tariff system adopted by PWA for the coastal region. However, based on the engineering team's understanding of the existing water prices, the expected price of water for industrial usage in the Gaza Strip (which vary from 0.7 to 2.5 NIS/m<sup>3</sup>) is 2.0 NIS/m<sup>3</sup> (0.5 US\$ /m<sup>3</sup>). This estimate is based on a study for PWA by LEKA (Lyonnaise Des Eaux Khatib and Alami), which identifies the average water cost in Gaza Strip (0.8 NIS/m<sup>3</sup>), the cost of the desalinated seawater (about 3.3 NIS/m<sup>3</sup> at source), and Mekorot pricing (about 2.1 NIS/m<sup>3</sup>).

It is assumed for the purposes of this feasibility that the well and the trunk line for REP will be handed over to the Coastal Utility Company, which will be in charge of the operation and maintenance costs of all the water and wastewater facilities in the Gaza Strip.

- **Option 2. Obtaining water from Mekorot:** According to the Concept Paper dated August 5, 1999, Mekorot will provide the REP with water. Mekorot will incur all the costs of the pipe, fittings, and installations that fall inside the Israeli areas. The delivery point of Mekorot water is to be located at the crossing of the main access road to the REP site (PR4) and the Delimiting Line. From this point, a 200mm UPVC pipe will be connected and installed to the ground reservoir located at REP, as described in Option 1. The total length of this pipe is about 1,400m. The current Mekorot water price for the Airport and other bulk consumers is 2.09 NIS/m<sup>3</sup>, including VAT. It is estimated that this price will remain valid for REP.

- **Option 3.** *Obtaining water from the Airport well<sup>2</sup> through a connection to the existing 200mm trunk line that transmits water from the well to the Airport.* The required connection is about 1,400m long, with a 200mm UPVC pipe diameter.

Preliminary discussions indicate that the Airport Authority would require the provision of electricity and a standby submersible pump (Q= 76 m<sup>3</sup>, H= 140 m) to the well.

The Airport's consumption in 1999 was about 70,000m<sup>3</sup>/year. This translates to an average daily consumption rate of about 200m<sup>3</sup>/day for the airport. This demand can be met by operating the existing well for three hours a day only. Even if the future demand of the Airport increases to 340m<sup>3</sup>/day (as estimated by the Airport officials), both the well and the trunk line will have the additional capacity to supply at least the first phase of the REP. The Airport also reserves the seventh connection on the Mekorot pipeline as an emergency source.

- **Option 4.** *Obtaining potable water from the Airport well through a new line and obtaining brackish water.* As requested by PIEFZA, this option combines both potable and brackish water sources and requires dual onsite water installations. The two main components of this option are:
  - a) *Potable Water Source.* It is assumed that the Airport well will be a potential source of potable water as in the case of Option 3. If the demand for potable water is assumed to be one third of the total demand, i.e. 400m<sup>3</sup>, a 4" pipe diameter will be sufficient instead of the 8" pipe diameter considered in Option 3.
  - b) *Brackish Water Source.* A well is to be dug 6km away from the REP site and a 6" diameter pipe will be installed to get brackish water.

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<sup>2</sup> The chemical analysis for the airport water as performed by PWA indicate that the water is potable.

**Table 6.8: Investment Costs of Options for Offsite Water Supply for Phase 1**

	Description	Quantity	Capital Cost (US\$)	Operation & Maintenance Cost (US\$/year)	Engineering Cost (US\$)
<b>Option 1</b>	1-Digging well 80m3/h capacity	1	150,000	25,000	15,000
	2-Trunk line 8" UPVC	11,000m	220,000	4,400	15,000
	3-Ground Tank 1000m3	1	200,000	4,000	16,000
	4-Elevated Tank 700m3	1	600,000	6,000	36,000
	5-Booster Station	1	100,000	2,000	8,000
	<b>Total Option 1</b>		<b>1,270,000</b>	<b>41,400</b>	<b>90,000</b>
<b>Option 2</b>	1-Trunk line 200mm UPVC	1400m	28,000	560	3,000
	2-Ground Tank 1000m3	1	200,000	4,000	16,000
	3-Elevated Tank 700m3	1	600,000	6,000	36,000
	4-Booster Station	1	100,000	2,000	8,000
	<b>Total Option 2</b>		<b>928,000</b>	<b>12,560</b>	<b>63,000</b>
<b>Option 3</b>	1-Trunk line 200mm UPVC	1400m	28,000	560	3,000
	2-Connect the well with electricity	Lump sum	60,000	25,000	0
	3-Provide standby submersible pump	1	8000	0	0
	4-Ground Tank 1000m3	1	200,000	4,000	16,000
	5-Elevated Tank 700m3	1	600,000	6,000	36,000
	6-Booster Station	1	100,000	2,000	8,000
	<b>Total Option 3</b>		<b>996,000</b>	<b>37,560</b>	<b>63,000</b>

## Rafah Enterprise Park Feasibility Study

Table 6.8 continued:

	Description	Quantity	Capital Cost (US\$)	Operation & Maintenance Cost (US\$/year)	Engineering Cost (US\$)
<b>Option 4</b>	1-Trunk Line 4" UPVC	1400m	16,000	320	3,000
	2-Connect the well with electricity	Lump sum	60,000	25,000	0
	3-Provide standby submersible pump	1	8000	0	0
	4-Drill well for brackish water	1	150,000	25,000	15,000
	5-Trunk Line 6" UPVC	6km	90,000	1,800	7,000
	6-Ground Reservoir 700m3 capacity	1	150,000	3,000	12,000
	7-Elevated Tank 400m3 capacity	1	400,000	4,000	24,000
	8-Booster Station for brackish water	1	100,000	2,000	8,000
	9- Ground Reservoir 500m3 capacity	1	120,000	2,400	10,000
	10-Elevated Tank 250m3 capacity	1	300,000	3,000	24,000
	11-Booster Station for potable water	1	100,000	2,000	8,000
	<b>Total Option 4</b>		<b>1,494,000</b>	<b>68,520</b>	<b>111,000</b>

The evaluation of the four options was made based on the following criteria:

- Cost;
- Integration with the second phase;
- Environmental concerns; and
- Ease of implementation.

Each one of the above criteria was scored, and this score was multiplied by a weighting factor assigned to each criterion according to its overall importance. Option 3 was selected, based on the highest weighted score it attained.

Table 6.9: Evaluation of Offsite Water Supply Options for Phase 1

Criteria	Weighting factor	Option 1		Option 2		Option 3		Option 4	
		Score	Weighted score	Score	Weighted score	Score	Weighted score	Score	Weighted score
Cost	0.3	2	0.6	4	1.20	3	0.9	1	0.3
Integration with second phase	0.2	4	0.8	2	0.40	3	0.6	1	0.2
Environmental concerns	0.15	2	0.3	4	0.60	3	0.45	1	0.15
Ease of implementation	0.35	3	1.05	2	0.70	4	1.40	1	0.35
<b>Total weighted scores</b>			<b>2.75</b>		<b>2.90</b>		<b>3.35</b>		<b>1.00</b>

The additional water demand for the second phase is about 1,130m<sup>3</sup>/day, and the total demand for both phases (1 & 2) is 2,340 m<sup>3</sup>/day. Since the total demand is forecasted to take place for the period between 2010 and 2020, it is necessary to deal with the total demand within the strategic plan for the water supply system in Gaza Strip at that time.

The Gaza Strip Water Supply Master Plan (prepared for PWA by LEKA) assumes that drinking water from all sources will be channeled to a main carrier, which will feed storage reservoirs located all over Gaza Strip. According to this plan, the segment of the water reservoir that serves the Rafah area will be functional by the year 2010. This reservoir is to be located 2.5 km from REP. To meet the water demand of the REP, construction of 200mm UPVC pipe from this reservoir to the REP ground reservoir will be required. The capital cost of this pipe will be about US\$50,000.

The design of all the components of the water supply system is based on the following assumptions:

- At least one-day storage capacity should be secured.
- The water that comes to the site (regardless of source) has to be collected in the ground reservoir, while the booster pump is to discharge the water to the elevated tank.

- The elevated tank would be high enough to supply the first phase of the REP with water by gravity.
- The ground tank would have a capacity to cover the demand of the two phases, but the elevated tank is designed to meet the demand of the first phase. This is due to the fact that the cost savings of a 40 percent reduction in ground tank capacity will be minimal, while a reduction of the elevated tank size will have considerable cost savings.

The following design criteria have been used. Hydraulic design equation used is Hazen William Equation:  $V = 0.85 C R^{0.63} S^{0.54}$ , where:

V= velocity (m/sec)

C= Roughness co-efficient

R= Hydraulic Radius (m)

S= Hydraulic Gradient (m/m)

- The value of C =130 was used for UPVC pipes
- The maximum velocity is 1.5 m/sec
- Minimum pressure at any point is 20ms
- Peak factor is 2
- Water consumption is assumed to be during 10 hours per day; thus, the average hourly demand is derived by dividing the daily demand by 10 hours.
- Material used will be UPVC
- Fire hydrants will be provided at distances not exceeding 120m, with a capacity of 60m<sup>3</sup>/h.
- Pressure rating of the pipes and ancillary fittings will be 10 bar.

Based on the above design criteria and assumptions, the components of the water supply system have been designed as follows:

- Ground reservoir with a capacity of 1,000m<sup>3</sup>, located at the highest point of the utility area. The reservoir is made of reinforced concrete with a circular cross section.
- Elevated tank with a capacity of 700m<sup>3</sup> and height of 30m located at the utility area. The elevated tank is made of reinforced concrete. The tank has a circular cross section.

- Booster pump station with three pumps, two of which can cover peak demand, with the third as a standby pump. The characteristics of the pumps are;  $Q = 120 \text{ m}^3/\text{h}$ ,  $H = 35\text{m}$ . At the first stage, two pumps can be installed, with a third one added after 4-5 years.

The available water storage capacity is checked against firefighting requirements by the following calculations:

The total water required for a fire of 4 hours duration is  $907\text{m}^3$  (minimum fire-flow requirement<sup>3</sup> is  $3780\text{L}/\text{min}$  ( $226.8 \text{ m}^3/\text{hr}$ )). The available water storage capacity for the first phase is  $1,700\text{m}^3$  plus the continuous pumping from the well at a rate of  $70\text{m}^3/\text{h}$ , which adds  $280\text{m}^3$  of water in 4 hours, to bring the total up to  $1,980\text{m}^3$  available. Thus, even in the case of a fire, there is enough water to meet the needs of the REP, i.e.

$1,700 + 280 - 907 = 1,073\text{m}^3$ , which is larger than the first phase demand of the Industrial Park ( $1,000\text{m}^3$ ).

### Waste Water System

The sewage generated by the REP will be collected by gravity and disposed off at the lowest point at REP area. Assuming that the ratio of the sewage generation is 0.85 of the water consumption, then the total amount of sewage is estimated at  $1,028 \text{ m}^3/\text{day}$  for the first phase, and  $1,989\text{m}^3/\text{day}$  when the two phases are fully occupied. The treatment of the collected sewage for the first phase can be accomplished in two different options:

- **Option 1.** This option involves constructing a treatment plant to serve only the REP, and re-using the treated sewage for irrigating the green areas inside REP, and/or allocating it for use by farmers who have agricultural land in the vicinity of the REP. However, the soil profile of the area indicates that the soil strata are composed of clay layers with a very poor infiltration rate, and any recharging of the aquifer would require a large land area. The components of this option are the treatment plant, a

<sup>3</sup> Source: E.W. Steel and Terence J. McGhee, *Water Supply and Sewerage*, 1979; RAMS/GUPTA, *Hydrology and Hydraulic Systems*, 1989

pumping station for discharging the treated sewage to the reuse locations, and a pressure pipe with 8" diameter for restricted irrigation.

The most practical and feasible alternative for treatment of the sewage flow is a Sequencing Batch Reactor (SBR) with a capacity of 1000m<sup>3</sup>/day. This alternative poses potential environmental problems independent of cost considerations. The treated water may become a problem if it is not completely consumed by agricultural uses (especially in wet season). Moreover, the sludge treatment and operation and maintenance of the treatment plant may become problematic.

- **Option 2.** In this option, the sewage will be collected in the same way as in Option 1 and be pumped out to the planned Main Treatment Plant (6 km to the north of REP). This option depends on the Rafah and Khan Younis WWTP being operational. The construction of this WWTP is expected to start in March 2001, and be functional by mid-2003. The disposal of the REP sewage entails the construction of a sewage pumping station and 7 km of 8" UPVC pipe. The water reuse, sludge treatment, and operation and maintenance issues would thus be eliminated for the REP. This option also includes a small-scale treatment plant to serve REP in the case of a delay with the Rafah and Khan Younis WWTP. The demand numbers indicate that 2ha of raw land at the EDC and 10ha of raw land at the IP will be occupied the first two years. This translates to 195m<sup>3</sup>/day of sewage production. Therefore, this option includes a compact SBR unit with a capacity of 200m<sup>3</sup>/day. The effluent from the compact SBR unit will be disposed off to the nearby storm water pond (see Section 6.10 for details) with a 1000m long 6" pipe in this case. Once the Rafah WWTP becomes operational, the raw sewage could directly be pumped to the WWTP and the compact SBR unit could be used elsewhere or kept as a spare.

The capital cost for the two options is summarized in Table 6.10. The disposal of the raw sewage to Rafah and Khan Younis WWTP will entail some fees per cubic meter of sewage.



Table 6.10: Capital Cost for Sewage Disposal Options

Option 1				
ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE (\$)	TOTAL PRICE (\$)
Complete SBR Unit (1000m3/day)	each	1	500,000	500,000
Pumping Station for Treated Sewage	each	1	300,000	300,000
Trunk line of 8" UPVC pipe for reuse	m	7000	18	126,000
<b>TOTAL</b>				<b>926,000</b>
Option 2				
ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE (\$)	TOTAL PRICE (\$)
Compact SBR Unit (200m3/day)	each	1	300,000	300,000
Pumping Station for Raw Sewage	each	1	400,000	400,000
Pressure Line 8" UPVC for discharging raw sewage	m	7000	18	126,000
Open Pond <sup>4</sup>	each	1	74,588	74,588
Pressure Line 6" UPVC to the pond	m	1000	12	12,000
<b>TOTAL</b>				<b>912,588</b>

There is not a big difference between the capital costs of the two options. The pumping energy cost will be almost the same in both options, because both pumped discharge and head will be almost the same. In both options, there will be the additional operation and maintenance cost to related to the SBR units installed. However, unlike Option 1, Option 2 addresses the environmental problems regarding the reuse of treated sewage and the sludge will be treated as part of the sludge of the Rafah and Khan Younis WWTP. While there will be an operational and maintenance cost of \$32,000/year for the compact SBR unit, there will be no such costs for onsite treatment once the Rafah and Khan Younis WWTP becomes operational. Thus, Option 2 is selected in servicing the REP.

<sup>4</sup> See Section 6.10 for cost details.

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Onsite Water Distribution and Wastewater

Water Distribution	<p>The onsite water distribution network is designed based on the same design criteria used for calculating the needs of the offsite water supply.</p> <ul style="list-style-type: none"> <li>▪ The water network includes one main pipe 200mm in diameter, sub-main pipe 160mm in diameter, and the distribution pipes of 110mm in diameter. The layout of the onsite network is shown in Appendix B.</li> <li>▪ All of the main and distribution network will be installed underground, along the roads. The water pipes will be located in the sidewalk, with a minimum cover of 0.8m. Wherever the pipes are laid under traffic roads, the minimum cover shall be 1.1m. Regardless of the width of the road, only one pipe in the road shall be installed.</li> <li>▪ The construction of the distribution network will be made in two stages, but the water tanks and the booster pump station will be constructed in the first stage.</li> </ul>
Waste Water	<p>The waste water system includes the collection network and manholes. The design of the onsite network was based on the following criteria:</p> <ul style="list-style-type: none"> <li>▪ Sewage production ratio is 0.85 of the water consumption.</li> <li>▪ Manning equation was used in the hydraulic design of the pipes. <ul style="list-style-type: none"> <li><math>V = 1/N R^{2/3} S^{1/2}</math>, where</li> <li>V= velocity, m/s.</li> <li>N= coefficient of roughness.</li> <li>R= hydraulic radius, m.</li> <li>S= slope of energy grade line, m/m.</li> </ul> </li> <li>▪ The value of N =0.01 was used in the pipe design.</li> <li>▪ The pipes material used is UPVC.</li> <li>▪ The maximum velocity is 2.4 m/sec at peak flow.</li> <li>▪ Minimum velocity is 0.6m/sec.</li> <li>▪ Minimum cover above the pipe is 1.1m.</li> </ul>

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- Minimum slope is 0.0033 m/m.
- Minimum size of pipes in roads is 200 mm.
- Maximum distance between the manholes should not be more than 100m, and the average distance is 60m.
- Factory connection is 160 mm in diameter, and each factory should have its own manhole at the set back of the factory.
- Peak factor is 2.0.
- The maximum depth of the flow is 80 percent of the pipe diameter at peak flow.

Based on the above design criteria, the peak flow was calculated for each pipe and accordingly the size of the pipes have been determined. All the pipes shall be installed underground along the roads. The pipes are to be located in the carriage way with minimum cover of 1.1m. All plot connections should be installed before the surfacing of the roads. Due to the topographical characteristics of the area, the sewage flow shall go into the collection network by gravity. Except for the main pipe that conveys the sewage to the WWTP, all the collection pipes will be 200mm in diameter.

## 6.8 Electricity

### Electrical Demand

The demand estimate was based on the knowledge and experience of the engineering team, a survey of the electrical consumption of similar industrial activities, and design values used for the industrial estates in the region (GIE, Israel, and Jordan). These figures are listed in Table 6.11.

**Table 6.11: Electrical consumption in similar developments**

Source	Consumption/ demand values (KW/dunum of building area)	Remarks
GIE	38	Consumption of the existing industries (26 dunums of building area)
Aqaba IE Jordan	110	Design Value
Omer Park Israel	90	Real consumption for incubation center with central AC available.
Industrial Areas in Israel	40	Warehouses
	230	Offices (25 lighting, 130 A/C, 75 miscellaneous)
	280	Manufacturing (25 lighting, 130 A/C, 125 manufacturing equipment)

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The following consumption/demand values were applied:

- Lighting: 15 KW/dunum of building area
- A/C: 130 KW/dunum of building area
- Miscellaneous: 50 KW/dunum of building area
- Manufacturing: 100 KW/dunum of building area
- Warehouses: 20 KW/dunum of building area

Based on calculations carried out for average size factory building, and taking into account that each factory building would have a space of 10 percent for offices, 20 percent for storage, and 70 percent for production, the electrical demand was estimated at:

- EDC: 130 KW/dunum of building area
- Industrial Park: 70 KW/dunum of building area
- Technical College: 50 KW/dunum of building area

The total electrical demand for the REP is presented in Table 6.12.

**Table 6.12: Electrical Demand**

	Building Area (dunum)	Phase 1 Demand Rate (KW/dunum)	Phase 1 Demand KW	Building Area (dunum)	Phase 2 Demand Rate (KW/dunum)	Phase 2 Demand KW	Total Demand KW
EDC	38.25	130	4,973	-	-	-	4973
IP	219	70	15,330	219	70	15,330	30,660
Technical College	-	-	-	30	50	1500	1,500
<b>Total</b>	<b>257.25</b>		<b>20,303</b>	<b>249</b>		<b>16,830</b>	<b>37,133</b>

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*Electrical Supply*

According to the Palestinian Energy Authority's (PEA) future plan for supplying the southern part of Gaza Strip with electricity, there is a proposed substation close to the road that connects Road No. 4 with the Sofa Crossing. From this substation, five high-tension lines are planned to be installed; 1 line to feed the Airport, 2 lines to feed Rafah City and 2 lines (with 24 MW capacity) to feed the REP. The implementation of this plan is pending the operation of the Gaza Power Plant (GPP). It is expected that the first phase of the GPP (with a capacity of 48 MW) will be functioning by the end of 2000. The construction of the southern sub-station is expected to start in mid 2001, and the construction is estimated to last 1.5-2 years.

The electrical demand for Phase 1 was estimated at 20.3 MW. Until the southern electrical sub-station is constructed and the two cables that will serve the REP site are in place, two options are available to meet the demand:

- **Option 1.** The Concept Paper dated August 5, 1999, indicates that the Israeli Electricity Company which currently supplies the Gaza Strip can be contracted for the first few years to provide REP with electricity. The cost of the entire offsite installations, including transformers, is estimated at about NIS 4 million (which will be incurred by the Israeli Electricity Company). In addition to that cost, there is the cost of installing a high-tension line with a capacity of 11 MW. This cost would be funded by the developer(s) or bilateral donor agencies.
- **Option 2.** Provide electricity through onsite diesel generators for the first two years and then connect to the main Gaza Electricity Network. The demand of the REP for the first two years is estimated to be 4.3 MW. This demand can be met by operating two diesel generators of 1.36 MW capacity each and another generator with 1.7 MW capacity. The total cost of these generators, including accessories, is US\$830,000. The breakdown of the electricity installation cost is shown in Table 6.13.

**Table 6.13: Cost Estimate of Diesel Generators for the first two years**

Description of items	Quantity	Unit Rate US\$	Total Cost US\$
1- 1.36 MW Diesel Generator <sup>5</sup>	2	250,000	500,000
2- 1.7 MW Diesel Generator	1	310,000	310,000
3- Main fuel tank and installation	1	10,000	10,000
4- Civil works	Lump sum	10,000	10,000
<b>Total</b>			<b>830,000</b>
Operation and maintenance/year			8,300
Engineering			5,000

These generators will be working as standby generators when the REP site is connected the southern sub-station.

Having the southern sub-station operating, one high-tension cable with 11 MW capacity should be installed to cover the demand of stage one, which has been estimated to be 10.23 MW. The demand of the second stage is estimated to be 10.1 MW, and should be covered by installing another cable with 11 MW capacity.

Due to cost and dependability reasons, Option 2 is selected for implementation. However, Option 1 will need to be implemented as well to provide a backup source for electricity. The cost of Option 1 is not accounted for, as it will be incurred by the Israeli Electricity Company.

## 6.9 Telecommunications

The only option to provide the REP with telephone lines is a connection to the Palestinian Telecommunication Company (PalTel) network. As mentioned in section 5.8, the main fiber optic cable that crosses the REP site needs to be re-located along the main road of the REP. The re-location cost is summarized in table 6.14.

<sup>5</sup> The costs of diesel generators are provided by Palestinian Tractor and Equipment Co. Ltd.

**Table 6.14: Cost Estimate for Offsite Telecommunication Works**

Description of items	Quantity	Unit rate US\$	Total US\$
1- Installation of fiber optic cable F32	2,200	15	33,000
2- Installation of 4 ducts 4" PVC	2,200	16	35,200
3- Installation of manholes	8	1,800	14,400
4- Joints	5	500	2,500
<b>Sub-total</b>			<b>85,100</b>
Operation and maintenance			by PaTel
5- RSU 500 lines	1	80,000	80,000

The estimated number of telephone lines required for the first phase is summarized in Table 6.15.

**Table 6.15: Demand for Telephone Lines**

Description of items	No. of Lines	Remarks
<b>Stage 1</b>		
EDC	35	4 lines for each building unit + 7 lines for admin. building
IP	260	3 lines for each factory + 20 lines for central services buildings
<b>Subtotal stage 1</b>	<b>295</b>	
<b>Stage 2</b>		
EDC	32	4 lines for each building unit
IP	192	3 lines for each factory
<b>Subtotal stage 2</b>	<b>224</b>	
<b>Total for Phase 1</b>	<b>519</b>	

The installation of one Remote Subscriber Unit (RSU) with a capacity of 500 lines will cover the demand of the first phase. PaTel will incur the cost of installing this unit.

The selected offsite infrastructure options for water, wastewater, electricity and telecommunications are summarized in Figure 6.9.



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### 6.10 Storm Water Drainage

Based on the meteorological records of PWA for the Gaza International Airport Station, the average annual rainfall at Rafah is about 150 mm (the lowest rainfall in the Gaza Strip), whilst the average annual rainfall in Gaza city is 370mm. The REP site is naturally sloping northeast allowing the surface drainage of runoff storm water.

To examine the likely flooding of the first phase development of the REP site, the runoff that might be generated from a one-hour event that occurs once every five years will be calculated.

According to the Master Plan for Sewerage and Storm Water Drainage in the Gaza Governorates that was prepared by SOGREAH, the intensity of rainfall for one-hour event that occurs once in five years is 26 mm/hr in Gaza and 22mm/hr in Khan Younis. Due to the lack of intensity duration curves for the Airport site, the one-hour intensity figure will be assumed to be 18mm/hr based on those of Gaza and Khan Younis. The total runoff that could be generated in one hour is calculated using the Rational Method, i.e.  $Q = C \times I \times A$ , where:

Q: the runoff rate (m<sup>3</sup>/hour)

C: runoff coefficient and it is assumed to be 0.65 for the Industrial Areas.

I: rainfall intensity (18mm/hr)

A: area of the first phase of the REP site (640,000m<sup>2</sup>)

Thus the runoff rate is calculated as:

$$Q = 640,000 \times 0.018 \times 0.65 = 7488\text{m}^3$$

If this runoff quantity were to be stagnated on the roads, the depth of water would be 4.5cm. This water depth will not cause any flooding problems for the factories and the traffic. Therefore, the storm water will be drained through surface drainage and there is no need to install any underground storm water utilities.

The design of the roads will be made in a way that the runoff will be drained to the green area that was considered as security buffer zone.

In order to calculate the size of the pond that will collect both the storm water of the REP site and the generated effluent from the 200m<sup>3</sup>/day capacity SBR unit, the following calculations are carried:

From the SBR Unit:

The volume needed to collect 25 days of effluent disposal, if the daily sewage is generated at 200m<sup>3</sup>/day will be:  
 $25 \times 200 = 5,000\text{m}^3$ .

From Surface Runoff:

To calculate the volume of the surface runoff water, a maximum one-day in twenty years rainfall would be considered. As per the Master Plan mentioned earlier, the maximum one-day rainfall intensity in Gaza is 92mm. Assuming that the maximum one-day rainfall intensity for the REP site is proportional to the average annual rainfall, then the one-day intensity is calculated as 37mm. The calculated total runoff that might be collected from the REP site using the above mentioned formula is 15,392 m<sup>3</sup>.

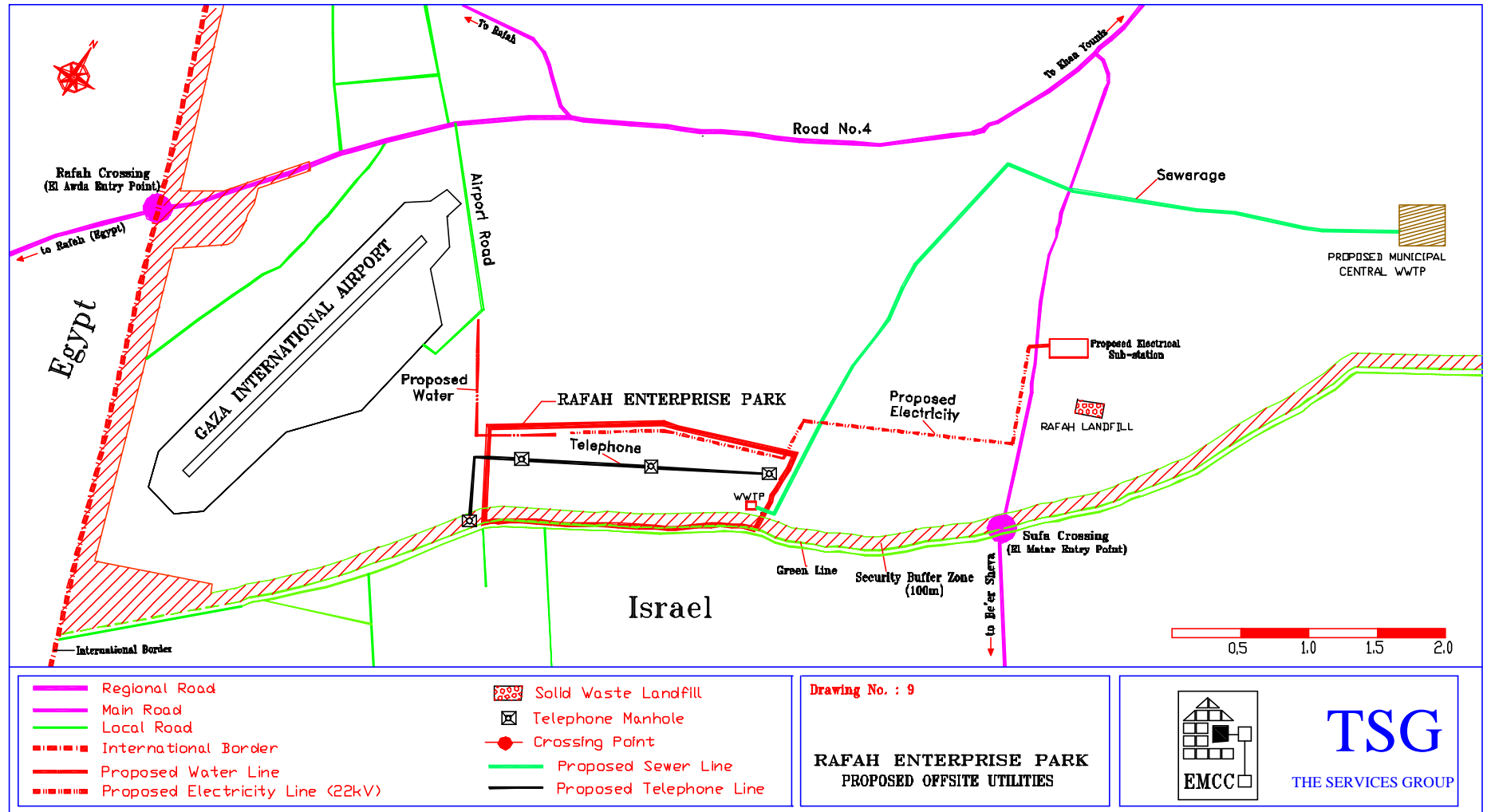
Thus the total volume of the pond should be able to accommodate 20,392m<sup>3</sup> (5,000 + 15,392) of water. Providing an emergency volume of about 10,000m<sup>3</sup>, the volume of the pond is selected to be 30,000m<sup>3</sup>. Since the water depth in the pond should be 1m to avoid generation of anaerobic processes, the size of the pond is determined to be 296m long x 70m wide x 1.5m deep <sup>6</sup>.

**Table 6.15a: Cost Estimate for Storm Water Pond**

Description of items	Total US\$
1- Excavation	60,520
2- Concrete Lining	13,068
3- Inlet Structure	1,000
<b>Total</b>	<b>74,588</b>

<sup>6</sup> See Annex B Drawing No: 23 for details.

Figure 6.9: Proposed Offsite Infrastructure



## 6.11 Physical Structures

The physical structures planned for the REP include Central Services buildings, Industrial Park buildings, and the Enterprise Development Center buildings.

### *Central Services*

The Central Services buildings include an administration building, commercial spaces available for offices, banks, and other businesses, and a clinic. A police station, a security station, and a fire station are also included. An area is reserved for a mosque, to enable the employees to perform their religious duties (see Figure 6.10).

Most of these buildings are planned to be reinforced concrete structures. Table 6.16 presents the floor space for each type of these buildings.

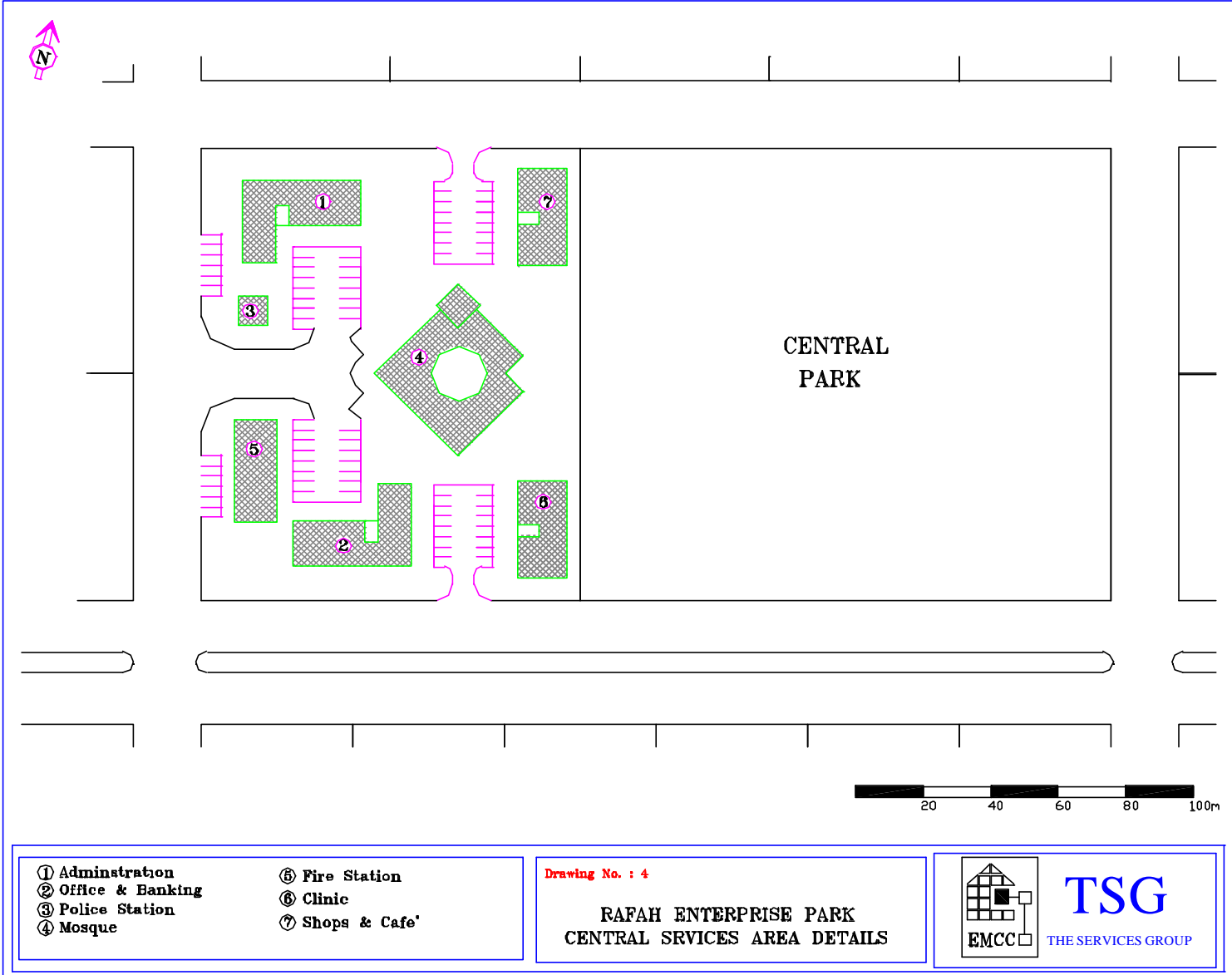
**Table 6.16: Floor Space for Ancillary Buildings**

Building	Floor Space (m <sup>2</sup> )
Administration	800
Banking/Commercial Offices	800
Clinic	200
Police station & security	50
Fire Station	250
Mosque	800
Public transport dept.	2,000
Shops / Café	500

### *Typical Buildings*

Different building types are proposed for different types of industrial activities. For the Enterprise Development Center, a typical building is proposed similar to the Tefen model of development. The total floor space for each building is 2,250 m<sup>2</sup>. Each building has the flexibility to be divided into four units of about 550 m<sup>2</sup> each.

Figure 6.10: Central Services Area



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The proposed buildings for EDC are steel structures for workspace and concrete structures for the service and office areas. The exterior walls of the buildings are designed with natural face stone cover. This will add to the value of the buildings and add to the aesthetics of the REP while decreasing the maintenance costs.

In the Industrial Park, four average plot sizes were planned, as shown below:

Type	Plot size m <sup>2</sup>	Building space m <sup>2</sup>
Compact	1,300	800
Light-intensity	1,750	1,000
Medium-intensity	2,700	1,800
Warehousing	3,850	3,000

Prototype models for the industrial park buildings are proposed. A typical steel building model of 1,000 m<sup>2</sup> and a typical concrete building of 1,000 m<sup>2</sup> are shown in Annex B.

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**Setbacks**

In the absence of specific regulations for industrial establishments publicized by the Civil Defense Directorate, the following minimum setbacks are proposed for all buildings in the Industrial Park, which are also in agreement with common engineering practice and standards:

- Front setback: 5 m
- Back setback: 5 m
- Side setbacks: 3 m

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**Parking Spaces**

Sufficient parking space is planned for each industrial unit (at least 12 spaces will be provided for each building). Additional parking spaces are also provided in the Central Services area. On-street parking is also allowed on some roads.

The Master Plan provides internal parking spaces for the factory managers, workers and visitors. There are 18 parking spaces per plot on average in the Industrial Park area. There are about 200

parking spaces per EDC Unit, which corresponds to 25 parking spaces per building. In addition, 70 parking spaces are provided in the central service area.

An external car park is necessary to cater for the employees using the public transportation. Due to cost reasons and lack of available space, the demand for the first five years will be considered while calculating the parking space needed. However, it is recommendable that land across from the Main Entrance is purchased for extra parking as the need increases. The demand figures indicate that the number of employees is expected to reach 5,000 by Year 5.

For calculation purposes, it is assumed that:

- The peak traffic will occur over a two-hour period at any day, and all vehicles will be able to make two roundtrips in this time.
- 5% of the employees (250 employees) will be factory owners and managers who will be allowed to park inside the REP.
- 10% of the employees (500 employees) are expected to be using private cars (2 passengers/car = 55 cars).
- 25% of the employees (1250 employees) might be using shared taxis with an average of 4 passengers/car. (2 trips per car = 157 cars),
- The rest (3000 employees) are expected to be using buses or minivans,
- 1000 employees will be using minivans (10 passengers/minivan, 2 trips per minivan = 50 minivans),
- 2000 employees will be using buses (40 passengers/bus, 2 trips per bus = 25 buses).

Hence, the total parking spaces required outside the REP (by the Year 5) is estimated to be approximately:

Type	Number of parking spaces	Space/vehicle (m <sup>2</sup> )	Total Space needed (m <sup>2</sup> )
Private cars	55	15	825
Shared taxis	157	15	2355
Minivans	50	20	1000
Buses	25	45	1125
<b>TOTAL</b>	<b>387</b>		<b>5305</b>

It is practical to provide an external car park outside the REP Site. The car park is expected to serve public transportation as well as visitors to the REP.

Increasing the total space needed (5305m<sup>2</sup>) by 1.5 times to account for the driving lanes, the total estimated area for an external car park can be estimated as about 8,000m<sup>2</sup>. The estimated cost for the construction of this car park is about \$240,000.

Four possible sites were considered for the Parking Area:

1. An area opposite to the main entrance of REP.
2. An area between the EDC and the border of the REP with the security buffer zone.
3. An area close to the utilities area in north side the REP.
4. An area outside the REP site to the north/

Options 1 and 4 were discarded due to difficulties with obtaining land. Option 3 was discarded due to security reasons as this location meant outside traffic was allowed inside REP. As a result, Option 2 was selected (see figure 6.4) as a site for public transportation and taxis. This area will be fenced and secured and will have no direct entrance to the REP. Commuters will use the Main Entrance Gate to go inside the REP.



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## **6.12 Landscaping**

Special attention is paid to landscaping at the REP. The main onsite road is 30 m wide with a central island of 3m width.

- The central island is to be planted with trees and grass.
- A Central Park is planned adjacent to the central services area.
- The setbacks of buildings are also planned to give a nice landscaping view.
- Special attention was also paid to landscaping in the EDC area. In each EDC, there is a central area reserved for a Green Park and open space.
- A green belt around the REP is proposed. This belt will enhance the aesthetics view as well as the environmental conditions.

## 7. Capital Investment Requirements

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### 7.1 Cost Assumptions

This chapter describes in detail the capital investment required for the development of Phase I (including both Stages 1 and 2, as described in the Master Plan) of the Rafah Enterprise Park. The detailed cost breakdowns are presented in Annex C.

The cost estimates for offsite infrastructure, onsite infrastructure, Enterprise Development Center units (modules), Industrial Park buildings, and the Central Services buildings have been compiled based on prevailing engineering and construction costs in the Gaza Strip. In addition, some cost items were based on specific industrial projects with which the engineering team is familiar. To ensure greater accuracy in costing, preliminary engineering designs were developed to cost the standard factory buildings. However, it is important to note that detailed engineering designs must be used for actual construction and tendering purposes.

The cost estimates assume that most construction materials will be locally available, or can be obtained at the current prices. For each activity, the material and labor costs are estimated first to yield the total construction cost. Design fees (4% of the estimated total construction cost), and supervision and management fees (6% of the estimated total construction cost) are then added to the estimated total construction costs. An additional 10% is added to this total to account for contingencies.

The final figures also account for environmental mitigation measures. During the construction stage, the costs of excavation and hauling of waste material to appropriate dumping sites were considered and included in the cost of civil works. Also, the cost of building a green belt around the perimeter of the park was included in the cost for landscaping and green area planting. As far as compensation for land acquisition and demolition of existing facilities, the cost estimations assume that PIEFZA will settle this issue with the current landholders.

To calculate the impact of customs duties on project costs, it is assumed that materials cost constitutes 70 percent of the total cost for construction and labor cost constitutes 30 percent of the total construction cost. Locally available materials (such as cement, aggregates, sand, UPVC pipes, corrugated steel sheets, reinforcement bars) are not subject to customs duties. Thus, while accounting for the costs without customs taxes, only customs duties that apply to imported items are considered. The unit prices presented include the Value Added Tax, at 17 percent.

In costing the Enterprise Development Center units, materials with higher standards than those that are commonly used in the Gaza Strip were considered in order to provide units that are comparable to the proposed Israeli Industrial Estate (which will be located at Kerem Shalom). It is assumed, for example, that the exterior walls of the units will be covered by natural face stone, and all units will be air-conditioned. Per square meter cost of industrial buildings (a total of 15 - 2250m<sup>2</sup> buildings in both EDC Units) in the EDC Units is estimated to be \$248.00 (inclusive of design, supervision and management fees, and contingency).

Cost structures for two different building types were prepared for the Industrial Park: a two-floor concrete factory building with a total floor plan space of 2,000m<sup>2</sup> and a steel factory building with a total floor plan space of 1,125m<sup>2</sup>. While per square meter cost of the concrete factory building was estimated to be \$142 (inclusive of design, supervision and management fees and contingency), the same for a typical steel factory was estimated to be \$210.

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In estimating the unit costs for the roads and sidewalks, the following assumptions were made as presented in Table 7.1.

**Table 7.1: Assumptions to Estimate the Unit Cost of Roads and Sidewalks**

ITEM DESCRIPTION	UNIT	Unit Price (\$/m2)
<b>Cost for Roads</b>		
Asphalt layer 8 cm thick	m2	9.0
Base course 30 cm thick	m2	8.0
Sub base layer 50 cm thick	m2	4.0
Excavation and back filling works	m2	2.0
Road lighting	m2	1.5
<b>TOTAL</b>		<b>24.5</b>
<b>Cost for Sidewalks</b>		
Interlock tiles 6 cm thick	m2	12.0
Base course 10 cm thick	m2	3.0
Sub base layer 15 cm thick	m2	2.0
Excavation and back filling works	m2	2.0
Curbstone and retaining beams	m2	4.0
Sidewalk lighting	m2	1.5
<b>TOTAL</b>		<b>24.5</b>

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Summary of Capital Costs

Table 7.2 summarizes the estimated capital budget costs for the Rafah Enterprise Park. Grand total for each component is calculated by summarizing the items under each component, and adding design, supervision and management fees and contingency to the sum.

**Table 7.2: Summary of Capital Budget Costs (US\$)**

		STAGE I	STAGE II	TOTAL PHASE 1
<b>1</b>	<b>Offsite Infrastructure <sup>1</sup></b>			
	Roads	705,600	2,587,200	3,292,800
	Water	996,000	-	996,000
	Waste Water	912,588	-	912,588
	Telecommunications	165,100	-	165,100
	Electricity	830,000	-	830,000
	SUB TOTAL	3,609,288	2,587,200	6,196,488
	Design fees (4% of subtotal)	144,372	103,488	247,860
	Supervision & Management fees (6% of subtotal)	216,557	155,232	371,789
	TOTAL	3,970,217	2,845,920	6,816,137
	Contingency (10% of the total)	397,022	284,592	681,614
	<b>GRAND TOTAL</b>	<b>4,367,238</b>	<b>3,130,512</b>	<b>7,497,750</b>
<b>2</b>	<b>Onsite Infrastructure <sup>2</sup></b>			
	Roads	1,911,000	2,263,800	4,174,800
	Water	74,050	39,950	114,000
	Waste Water	186,015	111,860	297,875
	Electricity	926,600	816,300	1,742,900
	Telecommunications	91,400	52,400	143,800
	Miscellaneous	1,968,700	522,500	2,491,200
	SUB TOTAL	5,157,765	3,806,810	8,964,575
	Design fees (4% of subtotal)	206,311	152,272	358,583
	Supervision & Management fees (6% of subtotal)	309,466	228,409	537,875
	TOTAL	5,673,542	4,187,491	9,861,033
	Contingency (10% of the total)	567,354	418,749	986,103
	<b>GRAND TOTAL</b>	<b>6,240,896</b>	<b>4,606,240</b>	<b>10,847,136</b>

<sup>1</sup> The details of the estimated Offsite Infrastructure costs are presented in Annex C Table C1.

<sup>2</sup> The details of the estimated Onsite Infrastructure costs are presented in Annex C Tables C2 through C7.

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		STAGE I	STAGE II	TOTAL PHASE 1
<b>3</b>	<b>Industrial Park Buildings<sup>3</sup></b>	509,091	-	509,091
	Design fees (4% of subtotal)	20,364	-	20,364
	Supervision & Management fees (6% of subtotal)	30,545	-	30,545
	TOTAL	560,000	-	560,000
	Contingency (10% of the total)	56,000	-	56,000
	<b>GRAND TOTAL</b>	<b>616,000</b>	<b>-</b>	<b>616,000</b>
<b>4</b>	<b>Central Commercial Services</b>	1,160,350	-	1,160,350
	Design fees (4% of subtotal)	46,414	-	46,414
	Supervision & Management fees (6% of subtotal)	69,621	-	69,621
	TOTAL	1,276,385	-	1,276,385
	Contingency (10% of the total)	127,639	-	127,639
	<b>GRAND TOTAL</b>	<b>1,404,024</b>	<b>-</b>	<b>1,404,024</b>
<b>5</b>	<b>Enterprise Development Center Units (with Optional Items)<sup>4</sup></b>	5,032,250	4,557,257	9,589,507
	Design fees (4% of subtotal)	201,290	182,290	383,580
	Supervision & Management fees (6% of subtotal)	301,935	273,435	575,370
	TOTAL	5,535,475	5,012,983	10,548,458
	Contingency (10% of the total)	553,548	501,298	1,054,846
	<b>GRAND TOTAL</b>	<b>6,089,023</b>	<b>5,514,281</b>	<b>11,603,303</b>
	<b>TOTAL of ITEMS (1+2+3+4+5)</b>	<b>18,717,180</b>	<b>13,251,033</b>	<b>31,968,213</b>

<sup>3</sup> The details of the estimated Industrial Park Building costs are presented in Annex C Table C9 and C10.

<sup>4</sup> The details of the estimated cost for EDC buildings are presented in Annex C Table 8.

## 7.2 Capital Costs

The capital costs associated with the development of Phase I (Stage I & II) of REP are presented in this section. Detailed cost sheets are included in Annex C. The following subsections outline the costs of the different elements considered.

### Offsite infrastructure

Table 7.3 sets out the costs of offsite infrastructure facilities for Phase I of the development. The costs of constructing roads, water supply, wastewater, electricity, and telecommunications are included. Most of the offsite infrastructure will be implemented at Stage I of the development.

**Table 7.3: Summary of Estimated Offsite Infrastructure Costs without Customs and VAT**

Item	Phase 1 Total Price (US\$)	Customs Duties	VAT	Total Price (US\$) without Customs and VAT
A. Roads	3,292,800	2%	17%	2,767,059
B. Water lines	996,000	1%	17%	844,068
C. Waste water	912,588	5%	17%	748,023
D. Telecommunication	165,100	0%	17%	141,111
E. Electricity	830,000	0%	17%	709,402
<b>Subtotal</b>	<b>6,196,488</b>			<b>5,209,663</b>
Design fees (4% of subtotal)	247,860			208,387
Supervision & Management fees (6% of subtotal)	371,789			312,580
<b>TOTAL</b>	<b>6,816,137</b>			<b>5,730,629</b>
Contingency	681,614			573,063
<b>GRAND TOTAL</b>	<b>7,497,750</b>			<b>6,303,692</b>

Table 7.4 summarizes the offsite infrastructure projects and the assumed source of funds for these projects.

Table 7.4: List of Offsite Infrastructure Projects

Project	Total Price (US\$)	Assumed Source of Planning/Funding
A. Roads		
PR1 (1.8km)	1,764,000	MoLG/Donor Agencies
PR2 (1.2km)	705,600	PA/Donor Agencies
PR3 (1.8km)	705,600	Civil Aviation Authority/Gaza International Airport
PR4 (1.4km)	235,200	PA/Donor Agencies
PR5 (0.5km)	140,000	PA/Donor Agencies
PR5 (1.6km)	448,000	MoLG/Donors
PR6 (3.5km)	588,000	PA/Donor Agencies
B. Water Lines	996,000	PWA/Donor Agencies
C. Waste Water	912,588	PWA/Donor Agencies
D. Telecommunication	165,100	PalTel/Donor Agencies
E. Electricity	830,000	PEA/Donor Agencies

*Onsite infrastructure*

Table 7.5 identifies the onsite infrastructure costs of development Phase I. Detailed cost sheets are included in Annex C.

Table 7.5: Summary of Estimated Onsite Infrastructure Costs without Customs and VAT

Item	Total Price (US\$)	Customs Duties	VAT	Total Price (US\$) without Customs and VAT
A. Roads	4,174,800	2%	17%	3,508,235
B. Water lines	114,000	1%	17%	96,610
C. Waste water	297,875	0%	17%	254,594
D. Electricity	1,742,900	0%	17%	1,489,658
E. Telecommunication	143,800	0%	17%	122,906
F. Miscellaneous	2,491,200	0%	17%	2,129,231
<b>Subtotal</b>	<b>8,964,575</b>			<b>7,601,234</b>
Design fees (4% of subtotal)	358,583			304,049
Supervision & Management fees (6% of subtotal)	537,875			456,074
<b>TOTAL</b>	<b>9,861,033</b>			<b>8,361,358</b>
Contingency	986,103			836,136



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<b>GRAND TOTAL</b>	<b>10,847,136</b>			<b>9,197,494</b>
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*Enterprise Development Center*

Table 7.6 sets out the cost of development of the EDC Unit 1 (with a site area of approximately 7,000 dunums) which will be constructed in Stage 1 of Phase 1 and will include a Central Building (1,000m<sup>2</sup>) and 7 industrial buildings (2250m<sup>2</sup> each). Table 7.5 presents the development costs of EDC Unit 2 (with a site area of approximately 7,000 dunums) which will be constructed in Stage 2 of Phase 1 and will include 8 industrial buildings (2250 m<sup>2</sup> each).

The cost of offsite infrastructure (water supply network, sewage network, electricity distribution lines, and telecommunications) that will serve EDC is included in the cost of overall offsite infrastructure for the REP. The cost of optional items is accounted for the EDC units. For costing purposes, it is assumed that 80 percent of investors will require these optional items. Detailed cost sheets are included in Annex C.

**Table 7.6: Estimated Cost for the Enterprise Development Center Unit 1**

Item Description	Unit	Quantity	Unit Price (US\$)	Total Price (US\$)	Unit Price with Fees <sup>5</sup>	Total Price with Fees (US\$)
<b>Industrial Buildings</b>	m <sup>2</sup>	15,750	193	<b>3,043,182</b>	234	<b>3,682,252</b>
<b>Industrial Buildings with Optional Items</b>	m <sup>2</sup>	15,750	205	<b>3,228,750</b>	248	<b>3,906,000</b>
<b>Central Building</b>	m <sup>2</sup>	2,000	300	600,000	363	726,000
A/C system	m <sup>2</sup>	2,000	75	150,000	91	181,500
Kitchen equipment	each	1	60,000	60,000	72,600	72,600
Canteen furniture	each	1	20,000	20,000	24,200	24,200
Seminar room	each	1	75,000	75,000	90,750	907,50
<b>Total Central Building</b>				<b>905,000</b>		<b>1,095,050</b>
<b>Other Onsite Items</b>						
Roads	m <sup>2</sup>	9,000	24.5	220,500	30	266,805
Sidewalks	m <sup>2</sup>	3,600	24.5	88,200	30	106,722
Parking + Loading	m <sup>2</sup>	12,600	23	289,800	28	350,658
Gardening	m <sup>2</sup>	17,600	10	176,000	12	212,960
Landscaping (walks)	m <sup>2</sup>	6,200	20	124,000	24	150,040
<b>Total of Other Onsite Items</b>				<b>898,500</b>		<b>1,087,185</b>
<b>TOTAL COST for STAGE I (Without Optional Items)</b>				<b>4,846,682</b>		<b>5,864,485</b>
<b>TOTAL COST for STAGE I (Including Optional Items)</b>				<b>5,032,250</b>		<b>6,088,233</b>

Table 7.6a below represents the EDC Unit 1 costs excluding Customs and VAT but including design, supervision and management fees and contingency.

<sup>5</sup> The design fees (4% of the construction price), supervision and management fees (6% of the construction price), and contingency (10% additional) are added to the unit prices.

Table 7.6a: EDC Unit 1 Costs without Customs and VAT

	Industrial Buildings	Industrial Buildings with Optional Items	Central Building	Other Onsite Items	Total Cost for Stage I (without Optional Items)	Total Cost for Stage I (including Optional Items)
<b>Cost (US\$)</b>	3,682,252	3,906,000	1,095,050	1,087,185	5,864,487	6,088,233
<b>Customs</b>	2%	2%	7%	2%		
<b>VAT</b>	17%	17%	17%	17%		
<b>Total Cost (Without Customs and VAT)</b>	<b>3,094,329</b>	<b>3,282,353</b>	<b>883,105</b>	<b>913,601</b>	<b>4,891,035</b>	<b>5,079,059</b>

Table 7.7 presents the estimated cost for the EDC Unit 2.

Table 7.7: Estimated Cost for the Enterprise Development Center Unit 2

Item Description	Unit	Quantity	Unit Price (US\$)	Total Price (US\$)	Unit Price with Fees <sup>6</sup> (US\$)	Total Price with Fees (US\$)
<b>Industrial Buildings</b>	m <sup>2</sup>	18,000	193.21	<b>3,477,923</b>	234	<b>4,208,287</b>
<b>Industrial Buildings with the Optional Items</b>	m <sup>2</sup>	18,000	205	<b>3,690,000</b>	248	<b>4,464,000</b>
<b>Other Onsite Items</b>						
Roads	m <sup>2</sup>	9,000	24.5	220,500	30	266,805
Sidewalks	m <sup>2</sup>	3,150	24.5	77,175	30	93,382
Parking + Loading	m <sup>2</sup>	13,200	23	303,600	28	367,356
Gardening	m <sup>2</sup>	18,000	10	180,000	12	217,800
Landscaping (walks)	m <sup>2</sup>	4,300	20	86,000	24	104,060
<b>Total of Other Onsite Items</b>				<b>867,275</b>		<b>1,049,403</b>
<b>TOTAL COST for STAGE II (Without Optional Items)</b>				<b>4,345,198</b>		<b>5,257,690</b>
<b>TOTAL COST for STAGE II (With Optional Items)</b>				<b>4,557,257</b>		<b>5,513,403</b>

<sup>6</sup> The design fees (4% of the construction price), supervision and management fees (6% of the construction price), and contingency (10% additional) are added to the unit prices.

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Table 7.7a below represents the EDC Unit 2 costs excluding Customs and VAT but including design, supervision and management fees and contingency.

**Table 7.7a: EDC Unit 2 Costs without Customs and VAT**

	Industrial Buildings	Industrial Buildings with Optional Items	Other Onsite Items	Total Cost for Stage II (without Optional Items)	Total Cost for Stage II (including Optional Items)
Cost (US\$)	4,208,287	4,464,000	1,049,403	5,257,690	5,513,403
Customs	2%	2%	2%		
VAT	17%	17%	17%		
<b>Total Cost (Without Customs and VAT)</b>	3,536,375	3,751,261	881,851	4,418,227	4,633,112

## Industrial Park

The construction costs of the Industrial Park (IP) standard factory units and central services buildings are shown in Table 7.8. Detailed breakdown of these costs are presented in Annex C.

**Table 7.8: Cost of Industrial Park Start-up Buildings and Central Services Buildings**

Description	Area	Unit	Unit price (\$/m <sup>2</sup> )	Total Price (US\$)	Unit price with Fees (\$/m <sup>2</sup> )	Total Price with Fees (US\$)
<b>Factory Construction</b>						
Type L (Floor Space = 1000 m <sup>2</sup> )	1,000	m <sup>2</sup>	175	175,000	210	210,000
Type M (Floor Space = 1800 m <sup>2</sup> )	1,800	m <sup>2</sup>	175	315,000	210	378,000
<b>TOTAL Cost for Start-up Buildings (1-Type L and 1-Type M)</b>				<b>509,091</b>		<b>588,000</b>
Type W (Floor Space = 3000 m <sup>2</sup> )	3,000	m <sup>2</sup>	175	525,000	210	630,000
<b>Central Services Buildings</b>						
Administration / Offices / Banking (2 floors)	1,600	m <sup>2</sup>	298	476,800	361	576,928
Clinic	200	m <sup>2</sup>	268	53,600	324	64,856
Police Station / Security	50	m <sup>2</sup>	248	12,400	300	15,004
Mosque	800	m <sup>2</sup>	268	214,400	324	259,424
Fire Station	250	m <sup>2</sup>	248	62,000	300	75,020
Public Transport Depot.	2,000	m <sup>2</sup>	51	102,000	62	123,420
Shops / Café	500	m <sup>2</sup>	248	124,000	300	150,040
Parking (excavation, asphalt, etc.)	3,550	m <sup>2</sup>	23	81,650	28	98,797
Landscaping	1,050	m <sup>2</sup>	22	23,100	27	27,951
Green areas	800	m <sup>2</sup>	13	10,400	16	12,584
<b>TOTAL Cost for Central Services Buildings</b>				<b>1,160,350</b>		<b>1,404,024</b>
<b>TOTAL STARTUP PACKAGE</b>				<b>1,669,441</b>		<b>1,992,024</b>

Table 7.8a below represents the Startup Package (A light and a medium Industrial Park Building and Central Services Building) costs excluding Customs and VAT but including design, supervision and management fees and contingency.

**Table 7.8a: Industrial Park Startup Package Cost without Customs and VAT**

	Industrial Buildings	Central Services Building	Total Startup Package
Cost (US\$)	588,000	1,404,024	1,992,024
Customs	2%	2%	
VAT	17%	17%	
<b>Total Cost (Without Customs and VAT)</b>	<b>494,118</b>	<b>1,179,852</b>	<b>1,673,970</b>

**Environmental Mitigation Measures**

The major cost associated with environmental mitigation is the relocation and compensation of local residents. It is assumed that this cost will be borne by PIEFZA, independent of the capital costs presented here. Another item required as part of the mitigation efforts is to establish a green belt around the perimeter of the park. The cost associated with this item is already covered in the costs of establishing and maintaining green areas.

**7.3 Recurrent Costs**

The developer of the Enterprise Park will incur the operating and maintenance costs of the following items:

- Internal road networks
- Street lighting
- Water distribution networks, reservoirs, and pumps
- Waste water collection system and WWTP
- Internal power distribution system
- Perimeter fence
- Landscaping
- Exteriors of the unit buildings

The annual operating costs are calculated using a percentage (ranging from 0.5 percent to 2.0 percent) of the total construction costs. It is also assumed that two crews will be on-site; an operational and maintenance department and an administrative and services department. The operation and maintenance department will require approximately 20 workers. The administrative and services department will also require approximately 20 workers. The costs associated with operating the Central Services buildings are not fully included, since it is assumed that part of the operating costs of the facilities will be covered through franchising and fee-for-service operations. Table 7.9 summarizes the annual operation and maintenance costs.

**Table 7.9: Summary of Annual Operation and Maintenance Costs**

	Cost Component	Annual Operation & Maintenance Cost (US\$)
<b>1.</b>	<b>Offsite Infrastructure</b>	
	Roads	67,032
	Water	37,560
	Waste Water	32,000
	Telecommunications	1,651
	Electricity	8,300
	<b>SUB TOTAL 1</b>	<b>146,543</b>
<b>2.</b>	<b>Onsite Infrastructure</b>	
	Roads	34,349
	Water	20,070
	Waste Water	2,653
	Electricity	8,656
	Telecommunications	1,308
	Miscellaneous	22,512
	<b>SUB TOTAL 2</b>	<b>89,548</b>
<b>3.</b>	<b>Industrial Park Buildings and Central Services Buildings <sup>7</sup></b>	<b>83,606</b>
<b>4.</b>	<b>Enterprise Development Center</b>	

<sup>7</sup> This cost includes the salaries of 20 administrative staff (US\$3,600/year each) plus %1 of the total cost for central services buildings.

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	Units Including Optional Items (1% of total cost)	116,538
	<b>GRAND TOTAL</b>	<b>436,235</b>

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*Environmental  
Monitoring Costs*

The costs associated with environmental monitoring will include:

- Water quality management
- Waste water quality management
- Air pollution monitoring

Based on the experience of Gaza Industrial Estate, it is assumed that the services will be contracted to private entities for monitoring quality control (i.e. Islamic University of Gaza, Al Azhar University, EMCC). The cost of environmental monitoring is estimated to be about US\$ 40,000.

**Table 7.10: Summary of Recurrent Costs**

Item	Annual Cost (\$)
Operation and maintenance	436,235
Environmental monitoring	40,000
<b>TOTAL</b>	<b>476,235</b>



## 8. Financial Analysis

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### 8.1 Financial Approach and Objectives

The basic approach adopted in this financial analysis is to combine the information contained in the demand analysis with the planning information and related costs, and to design and test a financial structure for the REP that is consistent with the institutional structure of PIEFZA and its goals and objectives.

Given that the primary role of PIEFZA is to promote the development of the REP as a generator of employment and investment, and to undertake public service actions not currently open to the private sector (such as land assembly), the main goal of the financial analysis is to determine the degree to which a private sector developer or consortium might have an appetite to invest in the REP. The analysis also provides an indication of the capital required to initiate and support the ongoing operation of the REP.

The specific objectives of the financial analysis are to determine:

- The financial returns that are likely to accrue to the landowner (assumed to be PIEFZA) and the developer under a range of appropriate assumptions;
- The level of public/donor support that may be required to ensure that a positive response will be received from private sector developers to the REP opportunity once it is made available;
- The financial robustness of the project under a range of demand, cost, and pricing conditions.

#### Approaches

To reach these objectives, a financial model was constructed that allows a range of variables to be independently tested. The main output of the model is the Internal Rate of Return (IRR) of the project cashflow for the developer and for PIEFZA, under a range of conditions. However, there are two separate but related elements to the REP, - the Industrial Park (IP), and the Enterprise

Development Center (EDC). These two elements were modeled separately because they display different characteristics in terms of costs, land use, and scale of demand, making concurrent modeling difficult and potentially confusing. Each element has its own assumptions and results, and these are described in subsequent sections. The results are then consolidated in the final conclusions section.

#### Common approaches between the IP and the EDC

In both cases, the following common approaches are taken:

- Land and some initial buildings (termed “starter buildings”) are made available by PIEFZA to a private developer on a long-term concession basis. The concession is for 30 years.
- Off-site infrastructure is installed by PIEFZA.
- The developer pays PIEFZA an up-front concession fee and an annual rent for the land. The developer also gives PIEFZA the opportunity to share in the profits from the development, once returns on capital invested rise to a certain level.
- The developer installs on-site infrastructure, and builds buildings to meet the demand for the REP that has been projected in Chapter 4 of this study. He charges rent and service charges, and recovers his capital over time.
- The performance of the project from the developer’s perspective is measured using the IRR over 20 years of his cashflow on the project. A residual value is ascribed to the project in year 20 to reflect the value of the unused remaining portion of the concession term.

### Different approaches between the IP and the EDC

The following are the main differences between the approach adopted for the IP and the EDC:

- Transaction type: while the IP models two types of transaction – buildings for rent and land for rent – the EDC uses only the building for rent approach. This is to be compatible with the approaches adopted in other EDCs in Israel.
- Only standard EDC buildings are provided as part of the “starter buildings” in the EDC. In the IP, several different types are provided (i.e. medium intensity manufacturing, light manufacturing, and common service space).
- A wider range of start-up support was considered for the EDC than for the IP. This was required in order to create a set of conditions that would be commercially attractive to a developer.

### Phases and Stages

In the physical planning of the REP, it was decided to plan the development in two Phases – Phase I and Phase II. This analysis is only concerned with Phase I, on the following grounds:

- Phase I as programmed represents over 60ha of development, more than enough to determine the feasibility of the project.
- Developments that take place outside of Phase I will happen outside of the critical time period (first 7 years) for this financial analysis. Conditions will have changed then, and a new set of assumptions will be required.
- The infrastructure provided for Phase I is also suitable for Phase II, so there is no material impact in excluding Phase II, since it will simply “plug-in” to Phase I under its own feasibility conditions.

Phase I is divided into two Stages – Stage I and Stage II. Stage I is activated at the commencement of the project, while Stage II is

activated (and the associated investments are made) when demand requires it. This protects the investors, both public and private sector, and optimizes the returns from the project.

The worksheets of all of the models under base case assumptions are included in Annex D of this report.

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## 8.2 Assumptions

The base case assumptions made in the financial analysis are listed below. Where the assumptions made in the case of the IP differ from those made in the case of the EDC, such differences are noted. Some of these assumptions are then tested in the sensitivity analysis.

### 1. Capital Costs

Capital costs are taken directly from the physical planning analysis. Four categories of cost are used:

**Offsite infrastructure** is provided under grant funding by donors. This is treated as a lump-sum cost for Stage I in the first year of the project, with an equivalent donation income to PIEFZA. Stage II is similarly handled as demand requires it.

**Starter buildings:** In the case of the IP, the initial factory and central services buildings provided under grant funding by donors amount to one 1,800 m<sup>2</sup> medium industry space, one 1,000 m<sup>2</sup> light industry space, and 2,000 m<sup>2</sup> of administration and commercial common space for use for common services. This is estimated to cost US\$ 1.82m. These costs are bundled together with offsite costs for the purposes of the analysis.

In the case of the EDC, one 2250 m<sup>2</sup> industrial/EDC building is provided at a cost of US\$728k.

A second scenario is also considered where all of the “starter building” support is concentrated on the EDC, with an initial provision by the public sector of 4,000 m<sup>2</sup> of EDC space.

**Onsite infrastructure** is provided by the developer to make the land available as serviced sites for his own use and for the use of

his clients. This cost is calculated by Stage and applied as the stages are deployed, in accordance with demand requirements.

**Onsite building costs:** Buildings are provided by the developer for rent to incoming investors. This cost is applied as buildings are provided to meet demand.

The capital costs applied in this analysis are outlined in Tables 8.1 and 8.2 below. The IP and the EDC have their own cost allocations. Common infrastructure costs for the two elements were allocated in proportion to the land area serviced.

Standard costs were also assumed for the provision of each type of building constructed by the developer for rental. These are US\$210/m<sup>2</sup> complete (includes design fees and contingencies) for factory buildings and US\$248/m<sup>2</sup> for EDC buildings.

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Table 8.1: Infrastructure and Starter Building Costs for Rafah IP

**3 Stages, 2 Phases, full cost**

	Gross Area (ha)	Net Area	Net/gross %	Offsite Cost \$	Gross Offsite /m2 \$	Net Offsite /m2 \$	Starter Buildings Cost \$	Gross Starter Buildings /m2 \$	Net Starter Buildings /m2 \$	Onsite Cost \$	Gross Onsite /m2 \$	Net Onsite /m2 \$
Stage 1	30	21	70%	3,541,004	11.80	16.86	1,991,600	6.64	9.48	5,060,186	16.87	24.10
Stage 2	20	14	70%	2,318,898	11.59	16.56	n/a			3,412,030	17.06	24.37
Phase 2	50	35	70%	-	0.00	0.00	n/a					0.00
Totals:	100	70		5,859,902	5.86	8.37	1,991,600	6.64	9.48	8,472,216	8.47	12.10

Table 8.2: Infrastructure and Starter Building Costs for Rafah EDC

**3 Stages, 2 Phases, full cost**

	Gross Area (ha)	Net Area	Net/gross %	Offsite Cost \$	Gross Offsite /m2 \$	Net Offsite /m2 \$	Starter Buildings Cost \$	Gross Starter Buildings /m2 \$	Net Starter Buildings /m2 \$	Onsite Cost \$	Gross Onsite /m2 \$	Net Onsite /m2 \$
Stage 1	7	5	74%	826,234	11.80	15.95	558,000	7.97	10.77	1,180,710	16.87	22.79
Stage 2	7	5	74%	811,614	11.59	15.67	n/a			1,194,210	17.06	23.05
Phase 2		-		-			n/a					
Totals:	14	10		1,637,848	11.70	15.81	558,000	7.97	10.77	2,374,920	16.96	22.92

## 2. Operational Costs

Operational costs are assumed for both PIEFZA and the developer. These are a combination of fixed and variable costs. The assumption is that the developer will assume most of the operational responsibilities for the REP, and that the PIEFZA will retain minimal regulatory and promotional responsibility.

The operational cost assumptions outlined in Tables 8.3 and 8.4 below are assumed to apply to the IP and the EDC.

**Table 8.3: Operational Cost Assumptions – IP**

Operational Costs - Developer			
Promotion costs \$/yr	50,000	or	3% of revenue, whichever larger
Management and o/head	50,000	or	3% of revenue, whichever larger
Service provision	50,000	or	75% of service charge income, whichever larger
Operational Costs - PIEFZA			
Promotion costs \$/yr	30,000		
Management and o/head	30,000		
Service provision	20,000	rising to	30,000

**Table 8.4: Operational Cost Assumptions – EDC**

Operational Costs - Developer			
Promotion costs \$/yr	20,000	or	3% of revenue, whichever larger
Management and o/head	50,000	or	3% of revenue, whichever larger
Service provision	50,000	or	75% of service charge income, whichever larger
Operational Costs - PIEFZA			
Promotion costs \$/yr	20,000		
Management and o/head	20,000		
Service provision	20,000	rising to	30,000

### 3. Timing and Phasing

The analysis considers that the initial phase of the REP is let under a concession agreement or equivalent instrument to a developer for a period of 20-30 years. The financial returns from the first phase (both Stages I and II) to the parties to the agreement over 20 years are considered, including a residual project value based on a multiple of income (10 in the base case) in year 20 to reflect the exit mechanism for the developer.

Phase I occupies 64 ha – 50ha for the IP and 14ha for the EDC. The timing of Stage II is demand-driven. In the base case, it occurs around year 5, but during the demand sensitivity analysis this timing changes as needed, along with the appropriate costs and incomes.

The development of Phase II of the REP is considered as a separate project, and outside the scope of this analysis, as discussed earlier.

Offsite infrastructure provided as part of the first phase (Stages I and II) is sufficient to service Phase II of the development, so the future timing of the remaining phases (up to 127 ha) is unimpeded by offsite infrastructural needs.

Under the base case scenario, the build-out rates are as illustrated in Table 8.5 for each of the elements.

**Table 8.5: Build-out Rates for the REP**

Element	Hectares Developed	By Year	Buildings Built <sup>1</sup>	By Year
Industrial Park (IP)	35ha	YR7	M = 42,705m <sup>2</sup> L = 15,345m <sup>2</sup> W = 4,950m <sup>2</sup>	YR7
Enterprise Development Center (EDC)	10.4 ha	YR6	31,080 m <sup>2</sup>	YR11

<sup>1</sup> Buildings owned and rented out by the private sector developer. M = medium intensity manufacturing, L = light intensity manufacturing, W = warehousing. These do not include buildings built on land rented to individual clients. In the EDC there is only one type of building and no land leases.



#### 4. Leasing of Property

The lease rate for land is set at US\$3.50/m<sup>2</sup>/year in the base case. This is based on current regional rates. There is no sale of land assumed, based on the preferences of PIEFZA.

In the IP, Standard Factory Building (SFB) rents are set at US\$30/m<sup>2</sup>/year for medium factory buildings in the base case, in line with current regional rates. Warehouse space is leased at US\$25/m<sup>2</sup>/yr and office space at US\$60/m<sup>2</sup>/yr.

The standard lease period for SFBs is 7 years, sufficient to give an adequate return to the developer. 100% occupancy is assumed on the basis that SFBs are built to order. The collection rate is assumed to be 95% (i.e. unpaid debts are 5%).

Land and buildings are assumed to appreciate in real value at 3% per annum, and this is reflected in the lease rates.

A service charge is applied to all occupiers of the REP under this model. The charge in the base case is US\$2/m<sup>2</sup>/yr for buildings (whether provided by the developer or built by the investors themselves), which covers the provision of common services to the occupiers of the industrial estate. A proportion of this contributes to the developer's income.

In the case of the IP, the transactions that take place are assumed to be split as outlined in Table 8.6 below.

**Table 8.6: Land and Building Transaction Split for the IP**

	Split of transaction type %		
	Rent space	Rent Land	Buy land
Medium Intensity manufacturing space	80%	20%	0%
Light Intensity manufacturing space	80%	20%	0%
Warehouse space	80%	20%	0%

As mentioned previously, in the case of the EDC, only building for rent transactions are considered.

## 5. Developer Agreement

The developer agreement (or concession agreement) is assumed to provide three separate sources of income for PIEFZA. These are: up-front payment, annual lease payment for concessioned land, and participation in the profits from the project once the return on investment (ROI) rises above a prescribed level. These are the variables that potential developers will manipulate within their offers when the competition for the right to develop and operate the REP is conducted.

In the base case scenario these payments are set as outlined in Table 8.7 below.

**Table 8.7: Base Case Assumptions for Developer Agreement**

Payment type	Industrial Park	Enterprise Development Center
Up front payment	US\$ 500,000	US\$ 0
Land lease	US\$2,000/ha/yr	US\$5,000/ha/yr
% of profits	5% once ROI > 15%	5% once ROI > 15%

## 6. Capital Structure of Developer

In the base case, it is assumed that the developer is able to apply a debt/equity ratio of 50% to his capital structure. Debt is assumed to be 7-year debt, at a real interest rate of 10%. This is in line with conditions available to developers in WBG at present.

## 8.3 Financial Scenarios and Returns

The two elements of the project (IP and EDC) are analyzed separately, i.e. as two separate projects. Conclusions are drawn for each element and then some analysis is performed on the combined investment and revenue streams for both elements. Overall conclusions are then drawn.

The results for each element include:

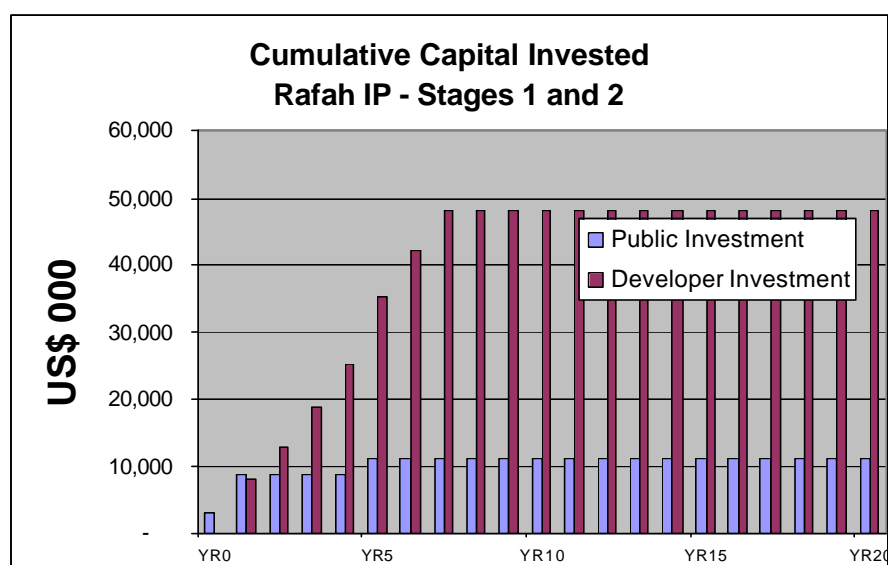
- A capital investment schedule for the public and private sector partners in the development of the IP and the EDC.
- An Internal Rate of Return (IRR) calculation based on the cash flow for the project from the perspective of the project promoter (PIEFZA) and the private developer under the concession arrangement.
- A series of analyses that measure the sensitivity of the project to changes in the following variables:
  - Demand for space.
  - Rent levels.
  - Debt/equity ratio.
  - Available level of initial support (in terms of starter buildings provided by PIEFZA/Donors).

These analyses for the two elements are described below.

#### 1. Capital Investment Schedule

The cumulative capital investment schedule for the **Rafah IP** is illustrated in Figure 8.1 below.

Figure 8.1: Cumulative Capital Investment, Rafah IP



The public sector element of this investment is illustrated in Table 8.8 below for the first 6 years (YR0 to YR5), when stage 1 and 2 investment takes place (in the base case scenario).

Table 8.8: Public Capital Investment in Rafah IP, YR0 to YR5, \$000

	YR0 2000	YR1 2001	YR2 2002	YR3 2003	YR4 2004	YR5 2005
<b>PIEFZA/Donor Investment</b>						
Offsite Infrastructure		3,541	-	-	-	2,319
On-site starter buildings		1,992				
Land Purchase	3,000					
Annual Public investment (US\$,000):	3,000	5,533	-	-	-	2,319
Cumulative Public Investment	3,000	8,533	8,533	8,533	8,533	10,852

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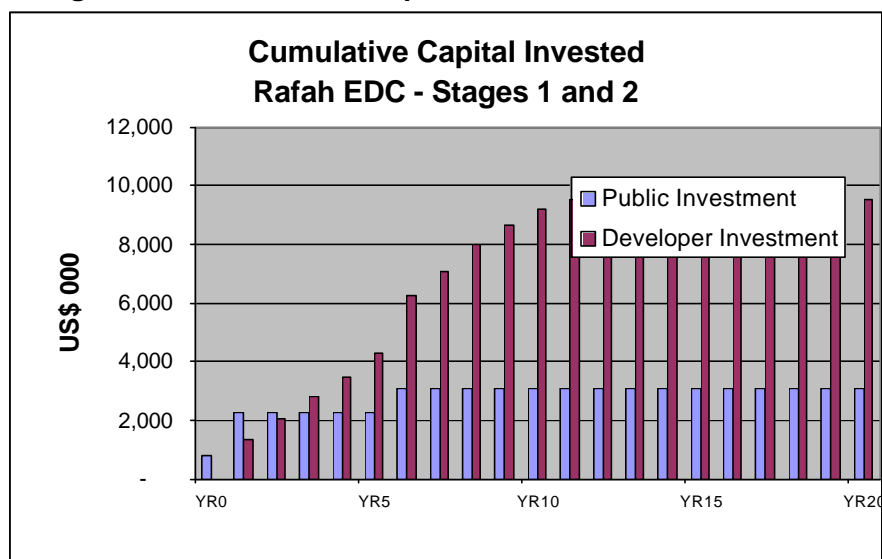
A similar picture for the private investment is illustrated in Table 8.9. This takes place over a longer period since the buildout of Stage 2 takes until YR7.

**Table 8.9: Developer Capital Investment in Rafah IP, YR0 to YR7, \$000**

Investment by Concessionaire	YR0	YR1	YR2	YR3	YR4	YR5	YR6	YR7	
	2000	2001	2002	2003	2004	2005	2006	2007	
On-site Infrastructure (\$,000)		5,060	-	-	-	3,412	-	-	
Buildings (\$,000)									
Medium-intensity manufacturing		1,416	2,691	3,587	3,838	4,107	4,395	3,503	
Light-intensity manufacturing		903	1,231	1,231	1,317	1,410	1,508	1,202	
Warehousing/logistics		574	1,021	1,021	1,093	1,169	1,251	997	
	-	7,953	4,943	5,840	6,249	10,098	7,154	5,703	
Annual Developer investment	-	-	7,953	4,943	5,840	6,249	10,098	7,154	5,703
Cumulative Developer Investment	-	-	7,953	12,896	18,736	24,985	35,083	42,237	47,940

The resulting ratio of capital investment by year 7 is 82% private developer/ 26% public sector (including land). The investment streams for the **Rafah EDC** are illustrated below in Figure 8.2.

**Figure 8.2: Cumulative Capital Investment – Rafah EDC**



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The public sector element of this investment is illustrated in Table 8.10 below for the first 7 years (YR0 to YR6), when stage 1 and 2 investment takes place (in the base case scenario).

**Table 8.10: Public Capital Investment in Rafah EDC, YR0 to YR6**

	YR0 2000	YR1 2001	YR2 2002	YR3 2003	YR4 2004	YR5 2005	YR6 2006
<b>PIEFZA/Donor Investment</b>							
Offsite Infrastructure(\$000)		826	-	-	-	-	812
<u>On-site starter buildings (\$000)</u>		558					
Land Purchase (at cost)	840						
Annual Public investment (US\$,000):	840	1,384	-	-	-	-	812
Cumulative Public Investment	840	2,224	2,224	2,224	2,224	2,224	3,036

A similar picture for the private investment is illustrated in Table 8.11. This takes place over a longer period since the buildout of Stage 2 takes until YR11.

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Table 8.11: Developer Capital Investment in Rafah EDC, YR0 to YR11

Investment by Concessionaire	YR0 2000	YR1 2001	YR2 2002	YR3 2003	YR4 2004	YR5 2005	YR6 2006	YR7 2007	YR8 2008	YR9 2009	YR10 2010	YR11 2011
<i>On-site Infrastructure (\$,000)</i>		1,181	-	-	-	-	1,194	-	-	-	-	-
<i>Buildings (\$,000)</i>												
EDC space		156	714	714	743	772	803	835	869	695	556	291
Other space type 1		-	-	-	-	-	-	-	-	-	-	-
Other space type 2		-	-	-	-	-	-	-	-	-	-	-
	-	1,337	714	714	743	772	1,998	835	869	695	556	291
Annual Developer investment (US\$,000):	-	1,337	714	714	743	772	1,998	835	869	695	556	291
Cumulative Developer Investment	-	1,337	2,051	2,765	3,508	4,280	6,278	7,113	7,982	8,677	9,233	9,525

In this case, the resulting ratio of capital investment by year 11 is 76% private developer/ 24% public sector (including land)

## 2. Financial Returns

In the case of the **Rafah IP**, the returns to the public sector in the base case are marginally negative (IRR = -5%), even when the cost of offsite infrastructure is assumed to be borne by donors. However, this situation arises from the initial land purchase cost, which is assumed at US\$6/m<sup>2</sup> (approximately US\$3m for stages I and II of the IP) – a cost that must be borne by PIEFZA. The cash flows to PIEFZA after year 3 are positive. Given that the land is assumed to be concessioned, not sold, to the private developer, this situation is acceptable in terms of financial returns.

The IRR of the developer's cashflow under the base case scenario is 14.97%, which is within the range that would interest potential developers. The base case scenario makes a number of assumptions:

- Rent level of US\$30/m<sup>2</sup>/yr plus a service fee of US\$3/m<sup>2</sup>/yr. While this is higher than current Gaza Industrial Estate (GIE) rates, building specifications and costs at the Rafah IP are higher. A reduction in building cost and specification could bring this rate in line with GIE.
- Annual real increase of 3% in property values
- Debt/equity ratio is 50% at an interest rate of 10% per annum. Loan term is assumed at 7 years.
- Starter buildings include 1,800m<sup>2</sup> of medium intensity manufacturing space, 1,000m<sup>2</sup> of light intensity manufacturing space and approx. 2,000m<sup>2</sup> of common use facilities, 850m<sup>2</sup> of which is available as common service buildings for rent by the developer.

In the case of the **Rafah EDC**, the results are less favorable. In the base case, public sector support is needed until year 20, with annual operational support costs ranging from US\$50,000 p.a. in



the beginning, falling linearly over time to approximately zero in year 19.

The IRR of the developer's cashflow under the base case scenario is 11.24%, which is probably not within the range that would interest potential developers. The base case scenario makes a number of assumptions:

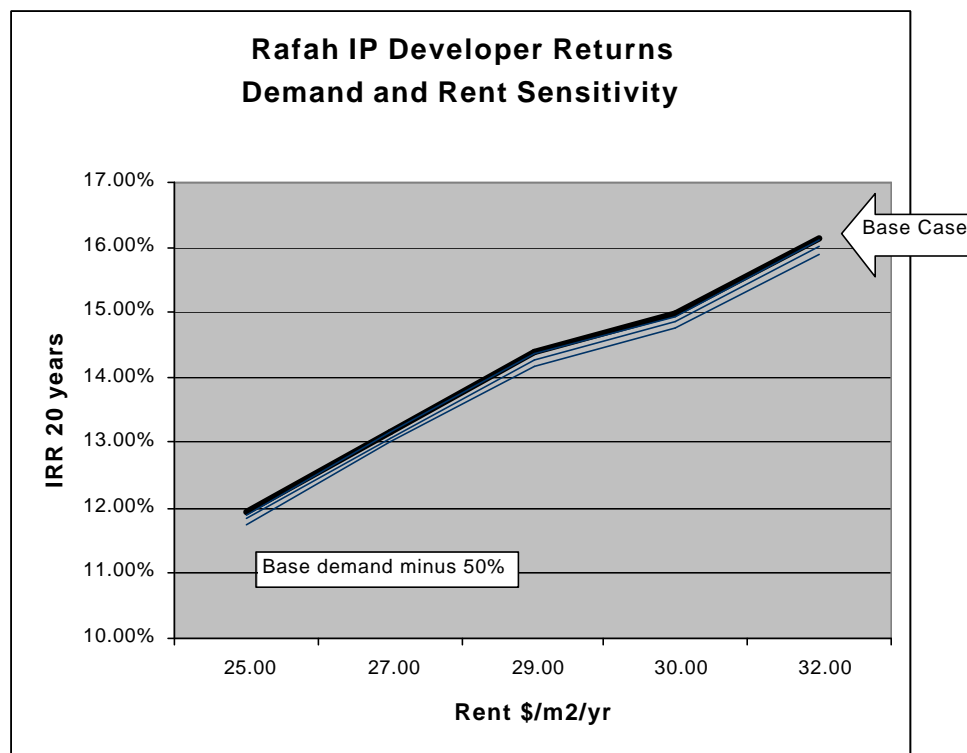
- Rent level of US\$30/m<sup>2</sup>/yr plus a service fee of US\$3/m<sup>2</sup>/yr. This is higher than current rates being paid in similar developments in Israel (US\$10/m<sup>2</sup> plus US\$1/m<sup>2</sup> service fee plus \$1.5/m<sup>2</sup> air conditioning fee), but the operation of these are subsidized. Given that the EDC building specification is at least as high as the IP building specification, similar rates to the IP are proposed.
- Annual real increase of 3% in property values and rents.
- Debt/equity ratio is 50% at an interest rate of 10% per annum. Loan term is assumed at 7 years.
- Starter buildings include 2,250m<sup>2</sup> of EDC space. This is the first building, and it is assumed that it is made available to the developer under the concession.

### 3. Sensitivity analyses

The return results were tested for sensitivity to changes in demand, rent levels, debt/equity ratios, and extent of initial support in the form of buildings and facilities provided by donors/PIEFZA. The results for each element are indicated below in Figures 8.3 to 8.6.

In the case of the **Rafah IP**, it can be seen from Figure 8.3 below that the park is relatively insensitive to demand. This is because of the staged nature of the infrastructure and build to demand policy of the developer. This is not true for rent levels. If rent levels were to slip to, say, US\$25/m<sup>2</sup>/yr from the assumed base case of US\$30/m<sup>2</sup>/yr, then returns slip to approximately 12.0% from 14.97%.

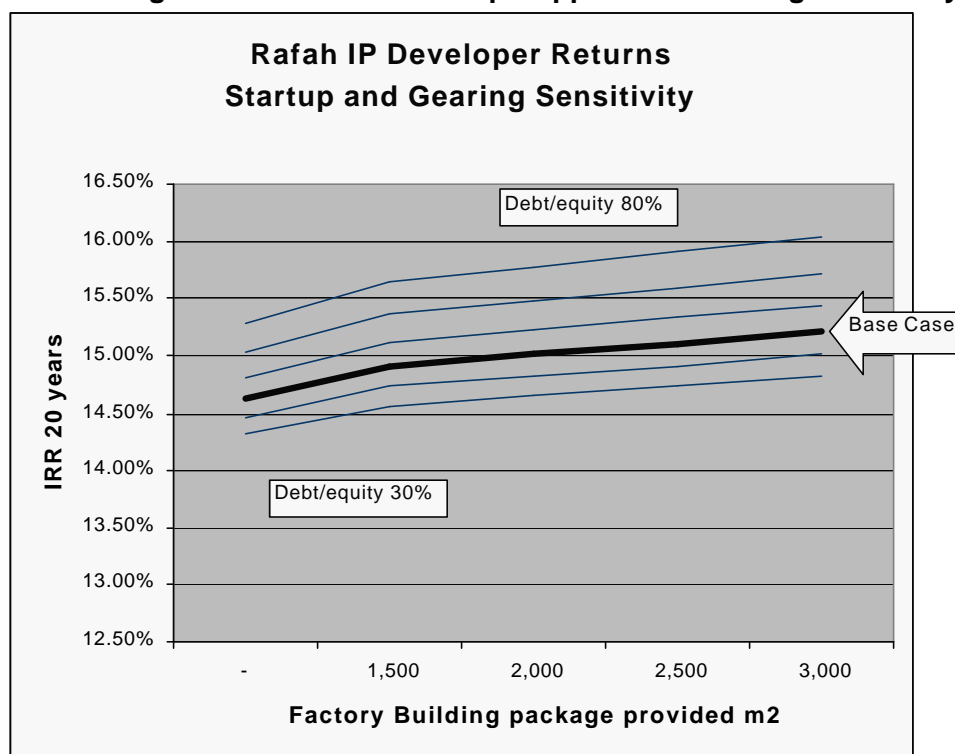
Figure 8.3: Rafah IP: Demand and Rent Sensitivity



The initial donor/PIEFZA support for the Rafah IP also helps to determine the rate of return for a developer. This is illustrated in Figure 8.4 below. In this figure, the factory building package is indicative – for example, the 1,500 m<sup>2</sup> package represents the provision of the following space by PIEFZA/donor:

- 1,500m<sup>2</sup> of Medium intensity manufacturing space.
- 1,500/1.8 = 835m<sup>2</sup> of Light intensity manufacturing space (in proportion to the medium intensity manufacturing space).
- 850m<sup>2</sup> of lettable common service space (constant).

Figure 8.4: Rafah IP Startup Support and Gearing Sensitivity

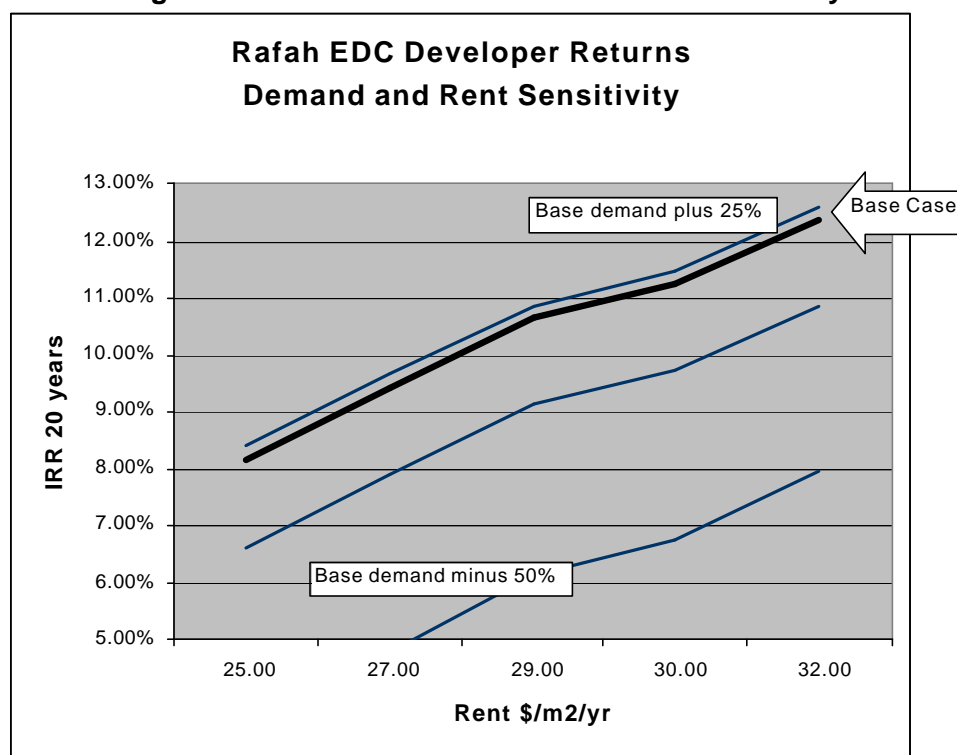


These results show that doubling the startup support from the base case (1,800m<sup>2</sup> package providing overall 1,800m<sup>2</sup> plus 1,000m<sup>2</sup> plus 850m<sup>2</sup> = 3,650m<sup>2</sup> lettable total) to a 3,600m<sup>2</sup> package (providing 6,450m<sup>2</sup> total) increases the returns to the developer from 14.97% to approximately 15.21%. This relatively insignificant increase is due to the overall scale of the project, which sees the developer build over 63,000 m<sup>2</sup> of buildings over 11 years.

Figure 8.4 above also shows that the debt/equity ratio plays an important part in the returns. Any increase over the base case of 50% helps the yield significantly.

The sensitivity analyses for the **Rafah EDC** reveals a different set of responses. These are partly due to the scale of development (smaller than the Rafah IP) and lower base case returns. This is demonstrated in Figures 8.5 and 8.6 below.

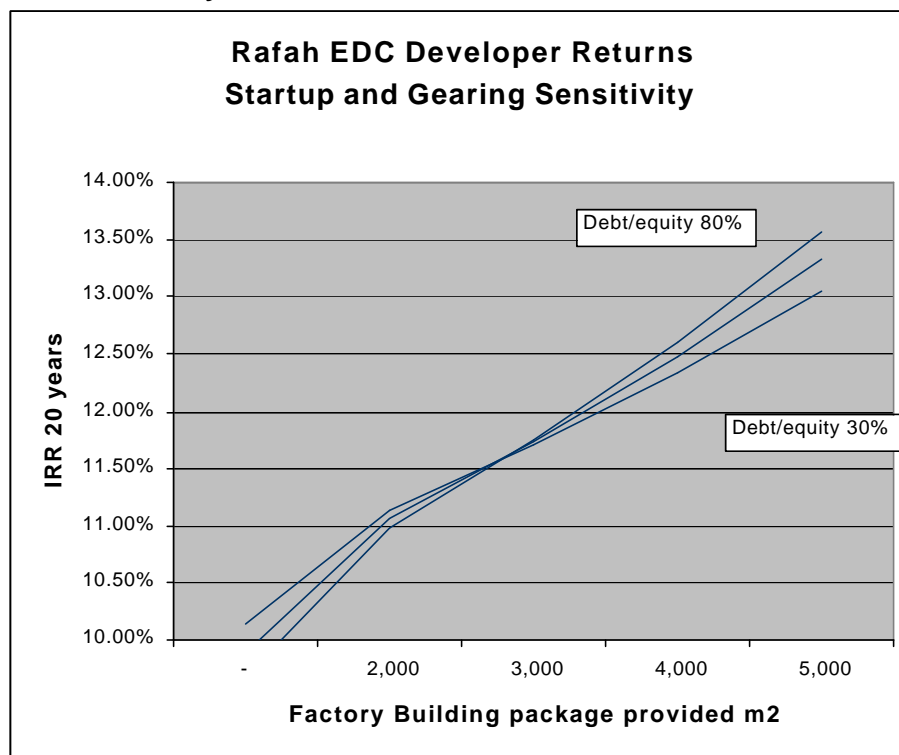
Figure 8.5: Rafah EDC Demand and Rent Sensitivity



It is clear from Figure 8.5 above that the developer needs to be able to charge his tenants in excess of US\$35/m<sup>2</sup>/yr if he is to make a return of close to 15%. An increase in demand has marginal impact, which indicates that construction costs relative to rents are expensive. A drop in demand has a big impact because it causes the free-revenue generating element of the project, the starter building, to drop its revenue in the early years, when this has the most impact.

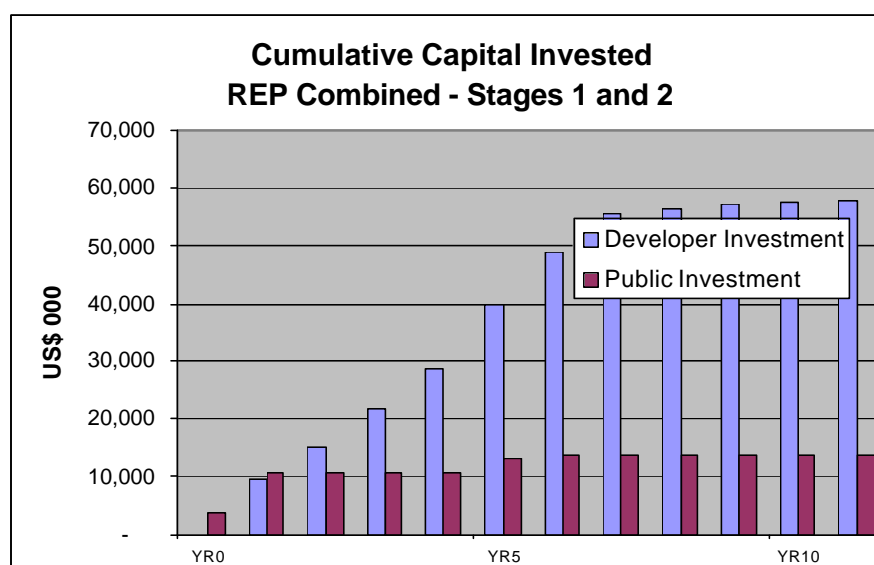
This aspect is further illustrated in Figure 8.6 below. By increasing the size of the initial building provided by PIEFZA/donors from 2,250m<sup>2</sup> to 5,000m<sup>2</sup> the developer's return only reaches 13.5% at the base rent of US\$30/m<sup>2</sup>/yr.

**Figure 8.6: Rafah EDC Startup Support and Gearing Sensitivity**



#### 8.4 Combined Results

A further analysis was made by combining the investment and income streams of the industrial park and the enterprise development center. The capital investment required from both the public and private sectors under this combined model is illustrated in Figure 8.7 below.

**Figure 8.7: Combined IP and EDC Cumulative Capital Invested**

Two scenarios were developed to further test the combined model. Scenario 1 is a direct combination of the individual base case models described in the previous sections. Scenario 2 assumes that no building support is provided to the Industrial Park by PIEFZA/donors and that all PIEFZA/donor onsite building support is concentrated on providing 4000m<sup>2</sup> of starter building to the EDC.

The combined results under both scenarios are indicated in Table 8.12 below.

**Table 8.12: IRR results for combined IP and EDC**

Scenario	Dev. IRR %	Dev. Inv \$m	Pub. Inv \$m	Total Inv \$m	Private %
1	14.40%	58.0	14.0	72.0	81%
2	14.09%	58.2	12.4	70.6	82%

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## 8.5 Overall Conclusions from the Financial Analysis

It is clear that a **traditional industrial park** at Rafah, with the initial donor/PIEFZA support assumed in the base case analysis, is feasible and will offer a developer returns of 15%. Given the clear commitment that has already been demonstrated by the PA to the project through its land acquisition actions, and the existence of the Rafah Airport, a developer should find this opportunity of interest. On this basis alone, it is possible to make a decision to proceed with the provision of the off-site infrastructure and starter buildings to the Rafah site.

It is, however, unclear how the **Rafah EDC** can attain feasibility without charging much higher rents than currently charged at equivalent facilities in Israel, and without significant public startup support - to the extent of PIEFZA/donors providing 5,000m<sup>2</sup> of EDC type building at startup.

However, from a practical perspective, these seemingly contradictory positions can be reconciled. The initial planning for the Rafah Enterprise Park (the collective term for the two elements – Rafah IP and Rafah EDC) can be made flexible enough to allow the elements to develop at their own pace. There are no substantive differences in the infrastructure requirements of the two elements, so it is possible to proceed with the provision of infrastructure on the basis of using it for an Industrial Park, while leaving the option open for the development of the EDC when conditions allow. Starter buildings can be designed to be flexible for both uses, and located in positions that do not compromise the basic land designation and planning. This will preserve the opportunity for the development of the EDC if and when the market rates reach the levels required.

This conclusion is further supported by the analysis of the combined development of the IP and EDC. The combined returns are in the region of 14% in both the base case and in the case where the primary onsite support for buildings is focused on providing buildings for the EDC. In all cases the public investment is leveraging a high degree of private investment in

property development, with each dollar invested by PIEFZA and its donors attracting three dollars from a private developer.

Based on this approach, it is recommended that:

- 1) Stage I off-site infrastructure be installed.
  - Given that the IP element is feasible without starter building support, initial resources should be programmed to support the EDC. A 4,000 m<sup>2</sup> building would provide a good start. This could double as a support building for both elements (IP and EDC) initially.
- 2) A concession strategy and agreement be designed for the REP that includes both elements – the IP and the EDC, and this floated to potential developers.



## 9. Fiscal and Economic Analysis

### 9.1 Introduction

This chapter summarizes the analysis of the Rafah Enterprise Park project's fiscal impact and economic costs and benefits. The analysis consists of two distinct components that were developed based on a common model, assumptions, and parameters. The first component is the fiscal impact analysis, which determines the effect of the Rafah Enterprise Park on the budget of the Palestinian Authority. This analysis calculates results that are net of a “no enterprise park” counterfactual. The second component is the economic analysis, which measures the net economic benefits of the REP on the Palestinian economy.

The chapter is organized as follows:

1. Fiscal Impact Analysis
2. Economic Analysis
3. Summary of Results and Conclusion

### *Expected Benefits*

The Rafah Enterprise Park is expected to constitute a significant economic opportunity for the Palestinian economy as a whole, and for the Gaza Strip in particular. Net static economic benefits for this type of project tend to be high, particularly for the local workers and the private sector. In addition, dynamic benefits, which are difficult to capture in formal economic modeling, are usually important. These benefits include technology transfers – both hard and soft –, entrepreneurship, and increased integration into the international economy.

### Restrictions and Economic Impact

The Rafah Enterprise Park will help to decrease the dependency of the Palestinian economy on Israel for the provision of employment. The most significant impact of the REP will be the creation of employment opportunities that are not subject to the external restrictions applied to the economy.

The fiscal and economic analyses measure the benefits and costs of the REP in the context of a Palestinian economy that does not

suffer from the restrictions that have affected it in the past. This analysis takes into account the long-term orientation of the project, benefits and costs being estimated over a twenty-year period starting in 2001. The potential cost of restriction is nevertheless included in the analysis under the form of a 'sensitivity to restrictions' factor. This factor is explained in detail in the analysis.

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## **9.2 Fiscal Impact Analysis**

### *The Model*

The REP project benefit-costs model includes a fiscal impact component and an economic analysis component. The benefits-costs model consists of one spreadsheet workbook, so that all assumptions used in the fiscal analysis are shared with the economic analysis. This ensures that the results of the two analyses are integrated and consistent.

The fiscal analysis covers only the REP case, so that all figures given are net of the no-REP case. In common with both the financial and the economic analysis, the fiscal impact analysis uses a 20-year project analysis period. The model includes individual worksheets with projections for principal components of the fiscal budget.

These components are:

1. Expenditures:  
Both current and capital expenditures are projected over the twenty-year period. It is assumed that the Palestinian Authority (with the exception of land contributed by PIEFZA), will make no equity investment in the private components of the Rafah Enterprise Park.
2. Income:  
Income from sources such as taxes, duties, fees, licenses, etc. are projected over the 20-year period. No income from dividends is programmed in the analysis.

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3. Pre-financing Cash Flow:  
The balance between expenditures and income is summarized here.
4. Financial Performance:  
The final key worksheet of the model is one that models financial performance. Since no financing is assumed, the balances on these sheets are the same as those presented in the pre-financing cash flow sheet. Net present values of the fiscal balances are calculated.

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*Parameters and Assumptions*

A number of assumptions have been developed for the analysis of the fiscal impact of the REP. These assumptions also apply to the economic analysis. These assumptions include:

Immigration

It is assumed that the REP will generate some immigration. Immigrants are assumed to represent 10 percent of the total labor force employed in the REP. This immigration will result in increased income tax revenues for the Palestinian Authority as well as increased sales tax revenues.

Wages

It is assumed that the Palestinian labor force is divided into three skill sub-groups:

1. Unskilled workers
2. Semi-skilled workers
3. Highly-skilled workers

Each group is subject to an average wage. The national wage used in the economic analysis is calculated as the average Palestinian wage per skill category, factored by the total Palestinian labor force. Wages are assumed to experience annual growth at constant rates, based on skill level.

Current Expenditures

A number of simplifying assumptions were used to derive projections for PA current expenditures directly resulting from the development of the Rafah Enterprise Park:

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- Customs Department: The Customs Department will incur costs as a result of the processing of imports in the REP. Expenditures are calculated as a function of annual imports.
- Income Tax Department: As in the case of the Customs Department, the Income Tax Department of the Ministry of Finance will face expenditures as a result of the tax collection. Expenditures are weighted on the basis of tax revenue collected.
- Ministry of Housing and Ministry of Public Works: The two ministries will face a number of expenditures due to the influx of population and economic activity to Rafah. These expenditures correspond to weighted capital expenditures.
- PIEFZA: PIEFZA's current expenditures from the REP will result from operating expenses relating to the administration of new investment, promotion, and related expenses. The administration and promotion functions are estimated on the basis of investment.

Capital Expenditures      As with current expenditures, a number of simplifying assumptions were used to develop projections for PA capital expenditures directly resulting from the development of the Rafah Enterprise Park. Because the government will not make equity investment in the park, capital expenditures are limited to public infrastructure outside of the Rafah Enterprise Park.

- Ministry of Housing and Ministry of Public Works: These ministries will incur capital expenditures to accommodate the expanding population and the increased demand on public infrastructure. These expenditures are calculated as proportions of the number of workers employed in the REP (Ministry of Housing), and of investment (Ministry of Public Works).
- PIEFZA: It is expected that PIEFZA will face a share of the fiscal burden brought by the Rafah Enterprise Park through capital and current expenditures. As a government agency,

PIEFZA's resources are derived directly from the government's budget, therefore affecting the overall fiscal balance.

Income

A number of simplifying assumptions are also made on the PA income sheet, which projects revenue sources and level of revenues resulting from the REP. These assumptions include:

- **Customs Revenues:** REP imports will be subjected to normal duty rates for intermediate goods and raw materials. The analysis assumes that a fixed proportion of imports are subjected to duties. The average duty rate is fixed at 20 percent.
- **General Sales Tax:** The REP will affect sales tax revenues in a number of ways. First, the PA will derive sales tax revenues from domestic sales of REP production. It is assumed that 10 percent of total output will be sold in the domestic market. The second source of additional sales tax revenues will be consumer expenditures from workers employed in the REP. Because a share of these workers were previously employed, the appropriate total sales tax revenues is calculated to reflect net revenues only.
- **Personal Income Tax:** Income tax revenues are calculated for wages generated through both direct and indirect employment (the economic analysis describes employment categories in more detail). For all employment created by the REP, it is assumed that there will be some worker displacement, which in turn impacts on income tax revenue. In addition, income tax revenues generated by workers who were previously underemployed and employed are not considered net revenue gains. Instead, an appropriate shadow price is applied to this revenue. The analysis includes as net revenues those which are derived from previously unemployed workers, and from immigrant workers who currently do not contribute to PA income tax revenue.

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- Corporate Income Tax: Corporate income tax revenues are calculated on the basis of the profits derived from REP-related operations.
- Net Profits from Operation of the REP: the government will derive revenue from the profits generated by the Rafah Enterprise Park. These profits will accrue to PIEFZA, which is here assumed to be an integral part of the Palestinian government.
- Investments in the Rafah Enterprise Park will also benefit from a number of incentives (see Benchmarking chapter for complete list).

Plant Relocations	Plant relocations from the rest of West Bank/Gaza to the REP – assumed to be 10 percent of total incremental Palestinian investment – represent a revenue loss for the PA. This loss is calculated on the basis of estimated temporary reductions in profits due to these relocations. This loss is not simply the result of these profit losses. In addition, these losses reflect the fact that transfer investments will not pay the normal tax until after the tax holiday/reduction period. This revenue loss is therefore only partially compensated over time.
Other income	No other major source of income for the Palestinian Authority has been included in the model. This is a conservative assumption, since no non-tax revenue sources (i.e. license fees and permits, land transfer taxes, added profits of public utilities, etc.) are included.

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Scenarios and Sensitivity Analyses

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Two scenarios are used to assess how changes in demand would affect the fiscal impact of the Rafah Enterprise Park.

Scenario 1 – Base Case: This scenario reflects the demand projections for the Rafah Enterprise Park based on the demand projections.

Scenario 2 – Reduced Demand Scenario: This scenario models a the fiscal effect of a reduction in overall demand by 30 percent.

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Results of Fiscal Analysis

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Scenario 1 – Base Case Demand Scenario:

Based on the assumptions described above, the fiscal analysis indicated that for the base case demand scenario, the impact of the REP on the Palestinian Authority is extremely positive, as shown in Table 9.1 below. The net present value (NPV) of the REP fiscal impact shows, at a conservative discount rate of 15 percent, a benefit of more than US\$ 30.5 million. This positive NPV is the expression of a significant cash flow over the life of the project, resulting from a sizeable net income stream. This net income stream is produced by important tax revenues directly connected to the Rafah Enterprise Park.

**Table 9.1: Summary of NPV of REP Fiscal Impact, Net of No-REP, in \$US, Base Case Scenario**

NPV, Net of No REP, at a Discount Rate of:	5%	\$164,764,129
	10%	\$70,554,757
	15%	\$30,581,347

Scenario 2 – Reduced Demand Scenario:

For the conservative scenario, the revenue of the Palestinian Authority is lower than in the previous case. The NPV remains

positive at a discount rate of 15 percent. At this rate, the NPV of the REP fiscal impact on the Palestinian Authority is US\$ 26.2 million. This still represents a very positive fiscal impact.

**Table 9.2: Summary of NPV of REP Fiscal Impact, Net of No-REP, in \$US, Reduced Demand Scenario**

NPV, Net of No REP, at a Discount Rate of:	5%	\$142,721,244
	10%	\$60,751,071
	15%	\$26,177,781

It should be noted that in both scenarios, the fiscal balance is negative over the first years of the project. This negative early performance results from the impact of the capital investment made by PIEFZA and the originally low tax revenues derived from the project's generated economic activity.

### 9.3. Economic Cost-Benefit Analysis

The economic cost-benefit reviews the economic contribution of the Rafah Enterprise Park to the welfare of Palestinian stakeholder groups, who are assumed to represent the entirety of Palestinian economic interests in the project. The purpose of the economic analysis is to estimate the net incremental economic benefits that the Palestinian economy will derive from the Rafah EP over the twenty-year project period. Economic benefits and costs accruing to non-Palestinians are included in the present analysis only when they directly impact the welfare of the Palestinian stakeholder groups included in the analysis.

The economic analysis measures net economic benefits and costs of the Rafah Enterprise Park. These benefits and costs would not occur if the Rafah EP were not developed. Each of the stakeholder groups identified below will derive both economic benefits and economic cost from the project.

The economic analysis accounts for these benefits and costs by estimating aggregated new revenues and expenditures for each of the stakeholder groups. For most of the stakeholders identified in



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the study, the Rafah Enterprise Park will bring economic benefits that must be subtracted from economic benefits they would accrue from alternative opportunities. The accounting of net economic benefits and costs is done through the estimation of opportunity costs. The opportunity cost of a given policy – in this case the development of the REP – for a given stakeholder group is the cost of the next best alternative available. The opportunity cost is calculated on the basis of a shadow price factor attributed to the gross economic benefit estimated. The opportunity cost consequently represents, for a given group of stakeholders, a share of the gross economic benefits they derive from the Rafah EP. In the absence of available shadow price factors for West Bank/Gaza, shadow prices used in the analysis are estimated based on international norms for similar economies.

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*Stakeholder Groups*

The Palestinian stakeholder groups identified in the model are:

1. Palestinian Workers
2. Palestinian Private Sector
3. Palestinian Authority

*Palestinian Workers*

The Rafah EP will bring significant economic benefits to the Palestinian economy through its employment impact. Two types of economic benefits to Palestinian workers are accounted for in the economic analysis:

1. Wages resulting from direct employment in the Rafah Enterprise Park;
2. Wages resulting from indirect employment through the increase in spending power generated by direct employment, and by the servicing of the REP (including REP tenants) by Palestinian suppliers.

In addition to the economic benefits accruing to Palestinian workers, the REP will produce a number of negative effects for Palestinian workers. First, the new employment created in the Park will be affected by varying opportunity costs resulting from

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the displacement of workers from other parts of the economy to the REP. Second, the REP will displace a number of Palestinian workers as a consequence of firm relocations. Third, a number of directly and indirectly employed workers will face new commuting expenses, since the REP will have to rely on workers from outside Rafah to supply labor demand in the Park. In addition, Palestinian workers' wage benefits are eroded through payroll taxes.

**Palestinian Private Sector**

As in the case of the Palestinian labor force, the Rafah Enterprise Park will positively affect the Palestinian private sector. Economic benefits stem from two distinct private sector groups:

1. Palestinian firms operating in the Park. The REP will generate incremental net increases in profits for Palestinian firms investing in the Park. While in reality a small share of these profits will not remain within the Palestinian economy, the present economic analysis assumes that profits of foreign investors are not repatriated.
2. Palestinian developer. The economic analysis assumes that 100 percent of the profits derived from investment in the development of the REP will remain within the economy.

As with Palestinian workers, the Rafah EP will also generate some economic costs to the Palestinian private sector. The most important cost will be the new investment made in the Park by Palestinian firms, the Palestinian developer, and the PIEFZA. In addition to this cost, Palestinian firms will face direct taxation of corporate profits.

**Palestinian Authority**

The Palestinian Authority will derive significant benefits from the Rafah Enterprise Park. These benefits will include:

1. Positive fiscal balance resulting from the REP, and
2. Foreign exchange earnings resulting from foreign investment in the REP and exports to external markets.

On the negative side of the economic contribution to the Palestinian Authority, a significant cost will be associated with the

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opportunity cost of land sold/leased. Environmental degradation will also represent an important cost to the PA.

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*The Model*

Based on the financial and fiscal analyses, the economic analysis estimates the economic impact of the Rafah Enterprise Park over the twenty-year evaluation period. The economic analysis is organized along four main elements:

**1. Net Incremental Economic Benefits:**

For each of the three stakeholder groups identified above, economic benefits that occur over the 20-year period are projected, net of the no-Rafah EP counterfactual case.

**2. Net Incremental Economic Costs:**

For each of the stakeholder groups, economic costs for the same period are estimated, net of the no-Rafah EP counterfactual case.

**3. Balance of Incremental Economic Benefits and Costs:**

The balance of incremental economic benefits and costs is estimated for each stakeholder group. Following this, a summed balance, representing the economic benefits and costs to the entire Palestinian economy, is calculated, net of the no-Rafah EP case

**4. Net Present Value:**

A calculation of the net present value (NPV) of net benefits is then carried out, using indicative discount rates (five percent, ten percent, and fifteen percent) for each stakeholder group and for the Palestinian economy as a whole. Calculation of the NPV allows an estimation of the projected value over the 20-year period at today's prices. In addition, the economic internal rate of return (IERR) of the project is calculated. The IERR constitutes a concise indication of the economic performance of the Rafah EP over time.

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*Parameters and Assumptions*

The economic benefit-cost analysis is based on a number of parameters and assumptions, including:

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- **Foreign Borrowing:** Foreign and local REP firms are assumed to be completely self-financing in hard currency terms. No local borrowing of hard currency by REP firms is assumed, for either infrastructure development or working capital.
- **Foreign Ownership:** It is assumed that foreign firms will own 83 percent of all equity in REP tenants. Foreign-owned firms are those that are assumed to convert foreign exchange into local currency to meet their local payment obligations.
- **Gross Output:** Gross output is calculated on the basis of the investment projections multiplied by a ratio corresponding to average domestic output performance in specific industries. Although in reality output increases are a reflection of improvement in productivity, the model assumes constant output. This is a conservative assumption.
- **Sales of Rafah EP Products:** It is assumed that REP enterprises, including Palestinian enterprises, export the vast majority of their output. As a consequence, only 10 percent of total output is sold on the domestic market.

#### Workers' Cost and Benefits

The analysis of economic benefits and costs to the Palestinian workers assumes the following:

##### Wages:

The Palestinian labor force is divided into four sub-groups:

- a. Medium-intensity manufacturing workers;
- b. Light-intensity manufacturing workers;
- c. Warehousing and logistics workers; and,
- d. Incubator workers.

Each group is assigned an average wage, corresponding to wage levels in current Palestinian industries. Gross wages are estimated annually, with a 1.5% *per annum* increase applied

throughout the life of the project. It is assumed that wage levels reflect the real productivity of labor.

Direct Employment:

Calculation of the opportunity cost of labor provides an accurate estimation of the real economic benefit to West Bank/Gaza represented by added employment in the REP. In effect, Palestinian workers taking employment in the Rafah EP potentially forego alternative employment opportunities. The opportunity cost calculation provides a measure of the cost of working in the REP, which must be balanced against the employment benefit.

*Direct Employment:*

*Disaggregated Benefits and Costs of Wage Income*

The total labor force directly employed by the Rafah Enterprise Park is disaggregated into seven sub-groups, each of which faces an opportunity cost of employment:

1. Immigrant workers from Outside West Bank/Gaza (OWBG):
  - This sub-group is assumed to represent 10 percent of the total REP workforce;
  - Opportunity cost begins at 80 percent and is progressively reduced to reach 50 percent in Year 10.
2. Immigrant workers from the Rest of West Bank/Gaza (ROWBG) who were formerly unemployed:
  - This sub-group is assumed to represent 10 percent of the total REP workforce;
  - Opportunity cost is 20 percent in Year 1, gradually brought to 50 percent in Year 10.
3. Immigrant workers from the ROWBG who are underemployed:
  - This sub-group is assumed to represent 5 percent of total;
  - Opportunity cost equals total wage earned by the group multiplied by a shadow price factor (from 40 percent in Year 1 to 50 percent in Year 10).

4. Immigrant workers from the ROWBG who have alternative employment opportunities:
  - This sub-group is assumed to represent 25 percent of total;
  - Opportunity cost equals total wage earned by the group multiplied by a shadow price factor (from 80 percent in Year 1 to 50 percent in Year 10).
5. Formerly unemployed residents of the Gaza Strip:
  - This sub-group is assumed to represent 30 percent of total;
  - Opportunity cost is 20 percent in Year 1, gradually brought to 50 percent in Year 10.
6. Underemployed residents of the Gaza Strip:
  - This sub-group is assumed to represent 20 percent of total;
  - Opportunity cost equals total wage earned by the group multiplied by a shadow price factor (from 40 percent to 50 percent).
7. Residents from the Gaza Strip who have alternative employment opportunities:
  - This sub-group is assumed to represent 20 percent of total;
  - Opportunity cost equals total wage earned by the group multiplied by a shadow price factor (from 80 percent in Year 1 to 50 percent in Year 10).

#### *Foregone Wages from Plant Closures*

Closure of plants in the WB/G for relocation to the Rafah Enterprise Park will result in job displacement and losses. The analysis assumes that 10 percent of Palestinian investment in the Rafah EP will come from transfers of activity from WB/G. The result of these transfers on workers welfare is expressed by a downward adjustment of their benefits by the proportional number of retrenched workers times their average wage net of personal income taxes.

Indirect Employment:

Direct employment in the Rafah Enterprise Park will generate indirect employment in the Palestinian economy. This generation of employment will result from the added revenue of workers in the Rafah EP. This revenue will be spent in the Palestinian economy, resulting in employment generated by new growth, net of no Rafah EP.

*Disaggregated Benefits and Costs to Wage Income*

Indirect employment is a function of direct employment: the greater direct employment, the larger indirect employment. Estimation of indirect employment is made on the basis of accepted international standards. These standards are applied by type of activity to be hosted by the REP. Each activity type is given a multiplier effect applied to its direct employment generation. The multipliers are:

1. Medium-intensity manufacturing: 1.5
2. Light-intensity manufacturing: 1.3
3. Warehousing and logistics: 1
4. Incubator: 1.8

The total labor force benefiting from indirect employment is disaggregated into three sub-groups, assumed to represent a given proportion of the total employed labor force and assumed to have the opportunity costs listed below. No significant internal migration is assumed to take place as a result of the employment opportunities created (though increased commuting costs incurred by workers are captured in the model). The distribution and shadow prices are as follows:

1. Formerly unemployed residents of Rafah:
  - This sub-group is assumed to represent 30 percent of total;
  - Opportunity cost is 20 percent in Year 1, gradually brought to 50 percent in Year 10.

2. Underemployed Residents of Rafah:
  - This sub-group is assumed to represent 15 percent of total;
  - Opportunity cost equals total wage earned by the group multiplied by a shadow price factor (assumed to be progressively rise from 40 percent in Year 1 to 50 percent in Year 10).
3. Residents from Rafah who have alternative employment opportunities:
  - This sub-group is assumed to represent 20 percent of total;
  - Opportunity cost equals total wage earned by the group multiplied by a shadow price factor (from 40 percent in Year 1 to 50 percent in Year 10).

#### Incremental Commuting Cost

It is assumed that all workers will face commuting costs as part of accepting employment in the REP. The assumed incremental cost of commuting for all workers is US\$ 500 per year. This is an average figure, intended to capture both local commuting and the relatively high commuting costs faced by workers traveling to the REP from other population centers in the Gaza Strip and to the West Bank.

#### Palestinian Private Sector's Cost and Benefits

As stated earlier in the chapter, the Palestinian private sector and the Palestinian economy as a whole will benefit from the Rafah Enterprise Park through the incremental net profits generated in the Park. Firms within the Palestinian private sector which stand to benefit from the Rafah EP form two distinct groups:

#### Rafah EP user firms:

The profits from these firms will be generated in the Rafah Enterprise Park. Profits for Palestinian firms in the Park are therefore benefits to be accrued by these firms. This category of investment is itself subdivided in two sub-groups:



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- a. Greenfield investments:  
Greenfield investment have no opportunity cost, as they result from new investment, net of Rafah EP. They are assumed to represent 90 percent of total Palestinian investment.
- b. Transfers resulting from closures of operations in WB/G:  
For Rafah EP investments resulting from closures in WB/G, benefits are reduced by the foregone profits from the closed operations. These foregone profits are assumed to be inferior to the long term profits in the Rafah EP by twenty percent, multiplied by a shadow price factor of fifty percent. This shadow price factor is lower than that used for labor, reflecting the assumption that investor facilities are less mobile than labor. The opportunity cost of capital is reflected in the discount rate used to calculate net present value of the balance of incremental benefits over costs net of the no-Rafah EP case. Relocated investment is assumed to represent 10 percent of total Palestinian investment.

Investments in the Rafah Enterprise Park will benefit from a number of incentives under two alternative schemes. The following alternative incentive schemes have been integrated in the economic analysis:

Rafah EP Developer

The REP will be developed by a private developer on a concession basis. Benefits to be derived from the REP are primarily net profits from the sale/lease of land and building to users, and from services charges. As is the case with investors, the developer will face a number of costs associated with the Enterprise Park:

- 1. Incremental investment
- 2. Corporate income tax on profits

Palestinian Authority's Cost and Benefits	As stated earlier, the Palestinian Authority stands to benefit from the Rafah Enterprise Park through the fiscal revenues derived from the operations of the Enterprise Park. The main income item, therefore, is the incremental fiscal impact balance net of the no-
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Rafah EP case. These revenues, as well as the expenditures incurred by the PA as a result of the Park, have been estimated and analyzed in the Fiscal Impact Analysis. Other economic benefits and costs to the Palestinian Authority include:

Environmental Costs:

It is estimated that most of the potential environmental damage resulting from the project is mitigated by development expenditures and offsite infrastructure. It is further assumed, however, that there is some level of unmitigated environmental damages, whose costs are, *in fine*, born by the Palestinian Authority. This environmental damage is estimated to be a product of industrial activity in the Rafah Enterprise Park and is measured on the basis of gross output.

Equity Investment in the Rafah Enterprise Park:

The model assumes that the Palestinian Authority has made no equity investment in the Enterprise Park. As a consequence, the PA will receive no dividends from the Rafah Enterprise Park.

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*Scenarios and Sensitivity Analyses*

The same demand scenarios used to assess the fiscal impact of the Rafah Enterprise Park are applied to the economic model and analysis:

Scenario 1 – Base Case Scenario: The base case scenario estimates the economic impact of the project on the three stakeholder groups and the project's economic internal rate of return

Scenario 2 – Reduced Demand Scenario: This scenario measures the impact on the stakeholders of a decline in demand for the REP of 30 percent.

## Rafah Enterprise Park Feasibility Study

**Results of Economic Analysis**

Using the assumptions and scenarios listed in the preceding section, the model produced the following results. Note that the Rafah EP produces significant economic benefits for the three groups identified, under all scenarios.

**Scenario 1: Base Case Scenario**

For the first scenario, economic benefits are significant for each stakeholder group, and for the entire Palestinian economy. As shown in Table 9.3, the Economic Net Present Value ranges from US\$223.8 million (with a discount rate of 15 percent) to US\$ 951.2 million (with a discount rate of 5 percent). The estimated Economic Rate of Return is 53 percent.

**Table 9.3: Summary of Economic Performance, Base Case Scenario, US\$**

	Discount rate	Workers	Private Sect.	PA	Total
Incremental Economic Net Present Value	5%	\$ 353,844,109	\$ 481,427,264	\$ 132,793,190	\$ 951,214,843
	10%	\$ 207,664,291	\$ 228,602,512	\$ 52,688,192	\$ 449,294,377
	15%	\$ 131,565,008	\$ 103,011,379	\$ 19,829,171	\$ 223,808,638
Incremental Economic Internal Rate of Return					53%

**Scenario 2: Reduced Demand Scenario**

As expected, the conservative scenario produces lower net economic benefits for all groups of stakeholders. The reason for this comparative decrease in net benefits is the fact that the model assumes a lower rate of investment in the Rafah Enterprise Park relative to the previous scenario. As shown by Table 9.4, the Economic Net Present Value ranges from US\$ 190.1 million (with a discount rate of 15 percent) to US\$ 841.1 million (with a discount rate of 5 percent). The estimated Economic Rate of Return, however, drops only three percentage points, to 50 percent.

**Table 9.4: Summary of Economic Performance, Reduced Demand Scenario, US\$**

	Discount rate	Workers	Private Sect.	PA	Total
Incremental Economic Net Present Value	5%	\$ 320,932,650	\$ 421,511,868	\$ 113,944,271	\$ 841,106,282
	10%	\$ 186,241,217	\$ 197,604,527	\$ 44,844,829	\$ 393,795,504
	15%	\$ 116,556,149	\$ 87,151,620	\$ 16,718,989	\$ 193,856,180
Incremental Economic Internal Rate of Return					50%

### Employment Generation

The Rafah Enterprise Park is expected to create a significant number of jobs in West Bank/Gaza. In addition to direct employment generated by the Park in Rafah, the REP is expected to create indirect employment in both the Rafah region and WB/G. Overall, net annual employment creation for the entire economy varies over time. It should be noted that the gross contribution to employment creation overestimates the employment effect of the Park, as it incorporates employment obtained by people who were previously employed and those who were underemployed. The net contribution is therefore a more accurate measure.

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### **9.4 Conclusion of Fiscal Impact and Economic Analysis**

The fiscal impact analysis demonstrates that, under the different scenarios established, under the set of assumptions and parameters used, and under the different sensitivity tests conducted, the Rafah Enterprise Park yields significant fiscal returns for the Palestinian Authority in all cases. None of the scenarios and sensitivity analyses results in negative NPVs, even when a high (15 percent) discount rate is applied. From the standpoint of the Palestinian Authority, the project proves to be highly sustainable, generating positive net fiscal income in an area that does not contribute significantly to the central budget today.

The economic analyses demonstrate that under the same test cases, the REP yields significant economic returns for all of the stakeholder groups identified. None of the scenarios and sensitivity analyses results in negative NPVs for any of the three groups, even when a 15 percent discount rate is applied.

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## 10. Implementation Plan

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### 10.1 Implementation Approach

The overall approach for implementing the REP is to initiate a series of parallel activities that result in the REP opening for business at the earliest possible date. In this context, “open for business” means that the following actions have been completed:

1. Installation of offsite infrastructure;
2. Selection and appointment of a developer/operator;
3. Installation of Phase 1 onsite infrastructure;
4. Initial marketing and publicity drive.

The main parties responsible for undertaking these activities are PIEFZA as the regulating government entity; other PA entities, especially those involved in infrastructure provision; and the developer/operator as private sector implementer and manager of the REP's operations. PIEFZA and other PA entities will in turn be required to negotiate with the Israeli side in finalizing agreements in the areas of infrastructure access and land use, especially at the site's perimeter, where it overlaps the existing security buffer.

While there is an understanding that a parallel “sister facility” will be developed on the Israeli side to complement the REP, this aspect of development is largely outside the control of PIEFZA, the PA, and the private developer/operator. While it is hoped that development on the Israeli side will proceed quickly, this implementation plan focuses only on near-term actions that are under the control of the three groups of actors listed above.

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### 10.2 PIEFZA Planning

PIEFZA has already begun the complex process of resolving the land ownership issues associated with the REP site. Most of these issues are being addressed, and PIEFZA is confident that it can proceed quickly with the final land assembly that is required to move the project forward. Agreement has also been reached in principle to allow construction within 100 meters (as opposed to the current 500 meter security buffer) of the Green Line.

Following complete site assembly, PIEFZA will have to move ahead with the process of preparing the site for transfer to a

private developer/operator. The engineering team estimated that a period of 4 months would be required to demolish and/or relocate facilities that are currently located on the site. In parallel, PIEFZA will have to move ahead on several fronts of phase 1 implementation:

1. Finalizing offsite design options;
2. Commissioning a detailed design for off-site infrastructure;
3. Tendering offsite construction contract; and
4. Arranging all land use and infrastructure permitting.

Marketing of the REP development opportunity to the private sector – either through an open tender or by entering negotiations with development groups who have already expressed an interest in the REP – can also begin in parallel with these activities. Award of the REP development to a private sector group should be based on a detailed on-site engineering design and a detailed agreement on risk and profit sharing through a concession agreement. Once the private developer/operated begins on-site construction, PIEFZA will be primarily involved in its role as regulator and promoter of the industrial estate regime, and as negotiator in ongoing implementation discussions with the Israeli side.

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### **10.3 Private Sector Implementation**

The bulk of the REP will be implemented by a private developer/operator group implementing the REP's onsite components by investing private capital, assuming risks, and aiming to achieve a profit by marketing the REP to private tenants. This developer/operator can be selected either through an open tender process, or by entering into direct negotiations with the development group that has already expressed an interest in the REP.

The developer/operator should be required to produce a detailed Phase 1 on-site engineering design as the basis for either a bid for the tender or for direct negotiations with PIEFZA. An agreed-on detailed design and revenue sharing arrangement will then be included in the terms of the concession agreement between the private developer/operator and PIEFZA. Given that the developer/operator will most probably be some form of consortium

that includes a design and construction company, and that many of the conceptual design issues will have already been identified and resolved through this study and through the detailed off-site design work, the time periods needed for the developer to design and install the on-site infrastructure should be as short as possible.

Once a private developer/operator firm is selected, that firm will carry the main responsibility for marketing the REP to individual retail investors/tenants. The developer will have been selected, among other criteria, on the basis of being able to mount a credible marketing campaign to ensure that the REP can quickly develop to its potential. The concession agreement should create appropriate incentives for aggressive marketing by the developer/operator, with all income tied directly to development. By selecting a developer in part on the basis of being able to respond to this marketing challenge, the REP will benefit from additional marketing expertise and business connections in addition to those available to PIEFZA.

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#### **10.4 Implementation Timeline**

An illustrative implementation timeline that incorporates these elements is described below.

Figure 10.1: Implementation Plan

Task	Responsible	Duration	2001			2002				2003			
			Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Site assembly	PIEFZA	2 months	■										
Demolition/relocation of structures	PIEFZA	4 months	■	■	■								
Permitting and licensing	PIEFZA	5 months		■	■								
Negotiations with Israeli side	PIEFZA	Ongoing	■	■	■	Ongoing							
Finalize off-site design options	PIEFZA	3 months	■										
Detailed off-site design	Contractor	6 months		■	■								
Award off-site contract(s)	PIEFZA	1 month				■							
Off-site Construction (Phase 1)	Contractor	6 months					■	■	■				
Submit detailed on-site proposal(s)	Developer(s)	5 months		■	■								
Select private developer	PIEFZA	1 month				■							
Finalize concession agreement	PIEFZA	2 months				■							
Construct on-site services (Stage 1)	Developer	8 months					■	■	■				
Construct industrial park (Stage 1)	Developer	12 months					■	■	■	■			
Construct EDC (Stage 1)	Developer	10 months					■	■	■				
Market REP - General	PIEFZA	Ongoing	■	■	■	■	Ongoing						
Market REP to investors/tenants	Developer	Ongoing					■	■	■	■	Ongoing		